Anritsu

ME3401A

Digital Transmission Analyzer

Service Manual

ME3401A

Digital Transmission Analyzer

Service Manual

Ninth Edition

Read this manual after reading the operation manual first. Keep it handy so that it can be read when necessary.

Measuring Instruments Division
Measurement Group

ANRITSU CORPORATION

JUN.
1996

Document No.: M-W0519BE-9.0

Safety Symbols

To prevent the risk of personal injury or loss related to equipment malfunction, Anritsu Corporation uses the following safety symbols to indicate safety-related information. Insure that you clearly understand the meanings of the symbols BEFORE using the equipment.

Symbols used in manual

DANGER	This indicates a very dangerous procedure that could result in serious injury or death if not performed properly.
WARNING	This indicates a hazardous procedure that could result in serious injury or death if not performed properly.
CAUTION	This indicates a hazardous procedure or danger that could result in light-to-severe injury, or loss related to equipment malfunction, if proper precautions are not taken.

Safety Symbols Used on Equipment and in Manual

(Some or all of the following five symbols may not be used on all Anritsu equipment. In addition, there may be other labels attached to products which are not shown in the diagrams in this manual.) The following safety symbols are used inside or on the equipment near operation locations to provide information about safety items and operation precautions. Insure that you clearly understand the meanings of the symbols and take the necessary precautions BEFORE using the equipment.

This indicates a prohibited operation. The prohibited operation is indicated symbolically in or near the barred circle.

This indicates an obligatory safety precaution. The obligatory operation is indicated symbolically in or near the circle.

This indicates warning or caution. The contents are indicated symbolically in or near the triangle.

This indicates a note. The contents are described in the box.

These indicate that the marked part should be recycled.

ME3401A Digital Transmission Analyzer
Service Manual

July 1989 (First Edition)
May 1996 (Ninth Edition)

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Printed in japan

For Safety

or

Repair

WARNING ⚠

WARNING

1. Always refer to the operation manual when working near locations at which the alert mark shown on the left is attached. If the operation, etc., is performed without heeding the advice in the operation manual, there is a risk of personal injury. In addition, the equipment performance may be reduced.
   Moreover, this alert mark is sometimes used with other marks and descriptions indicating other dangers.
2. When supplying power to this equipment, connect the accessory 3-pin power cord to a 3-pin grounded power outlet. If a grounded 3-pin outlet is not available, before supplying power to the equipment, use a conversion adapter and ground the green wire, or connect the frame ground on the rear panel of the equipment to ground. If power is supplied without grounding the equipment, there is a risk of receiving a severe or fatal electric shock.
3. This equipment cannot be repaired by the user. DO NOT attempt to open the cabinet or to disassemble internal parts. Only Anritsu-trained service personnel or staff from your sales representative with a knowledge of electrical fire and shock hazards should service this equipment.

Changing Fuse

CAUTION ⚠

CAUTION

1. Before changing the fuses, ALWAYS remove the power cord from the poweroutlet and replace the blown fuses. Always use new fuses of the type and rating specified on the fuse marking on the rear panel of the cabinet.

   T□□□ A indicates a time-lag fuse.
   □□□A or F□□□ A indicate a normal fusing type fuse.

   There is risk of receiving a fatal electric shock if the fuses are replaced with the power cord connected.

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Equipment Certificate

Anritsu Corporation certifies that this equipment was tested before shipment using calibrated measuring instruments with direct traceability to public testing organizations recognized by national research laboratories including the Electrotechnical Laboratory, the National Research Laboratory and the Communication Research laboratory, and was found to meet the published specifications.

Anritsu Warranty

Anritsu Corporation will repair this equipment free-of-charge if a malfunction occurs within 1 year after shipment due to a manufacturing fault, provided that this warranty is rendered void under any or all of the following conditions.

- The fault is outside the scope of the warranty conditions described in the operation manual.
- The fault is due to misoperation, misuse, or unauthorized modification or repair of the equipment by the customer.
- The fault is due to severe usage clearly exceeding normal usage.
- The fault is due to improper or insufficient maintenance by the customer.
- The fault is due to natural disaster including fire, flooding and earthquake, etc.
- The fault is due to use of non-specified peripheral equipment, peripheral parts, consumables, etc.
- The fault is due to use of a non-specified power supply or in a non-specified installation location.

In addition, this warranty is valid only for the original equipment purchaser. It is not transferable if the equipment is resold.

Anritsu Corporation will not accept liability for equipment faults due to unforeseen and unusual circumstances, nor for faults due to mishandling by the customer.

Anritsu Corporation Contact

If this equipment develops a fault, contact Anritsu Corporation or its representatives at the address in this manual.

Note:

Ac line power supply voltage rating change

The ME3401A is provided with a power transformer with several taps so that a nominal ac line voltage specified from 100 to 240 Vac can be used.

When changing the nominal ac line voltage rating, change the wiring of the appropriate primary taps of the power transformer in accordance with Fig. 1.

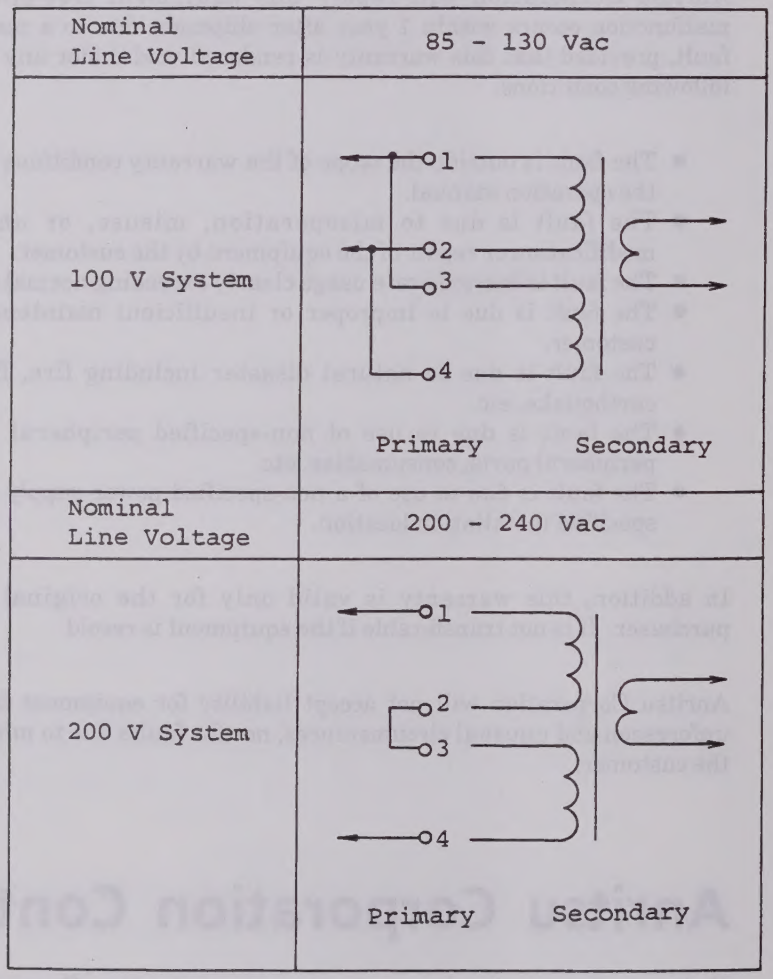

Fig. 1 Power Transformer Tap Connection

Part Names & Part Numbers

Please specify the part numbers shown in the parts list when making inquiries or when ordering parts. There may be a difference between the names of parts used in this manual and the parts actually used in the equipment or supplied for repair. This is because equivalent parts with the same functions, performance and reliability as the parts specified in the circuit diagrams and parts list have been used or supplied. Since the parts are equivalent, they have absolutely no adverse effect on the equipment specified functions, performance or reliability.

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SECTION 1

GENERAL

This is the service manual for the ME3401A DIGITAL TRANSMISSION ANALYZER. It contains the following sections.

SECTION 2 MECHANICAL CONFIGURATION

This section describes how the various PC board are laid out.

SECTION 3 TROUBLESHOOTING AND ADJUSTMENT

This section describes how to troubleshoot the equipment. Circuit diagrams for the ME3401A are given in this section.

SECTION 4 REPLACEABLE PARTS

This section explains how to order replacement parts from the parts list.

For the specifications, operating instructions, performance check, and a detailed description of the ME3401A panel controls, refer to the separate operation manual.

SECTION 2

MECHANICAL CONFIGURATION

2.1 Introduction

This section explains how to disassemble the ME3401A.

2.2 Disassembly

2.2.1 Cabinet disassembly

Table 2-1 Mechanical Parts List

No.	Parts No.	Description	Remarks	Qty.
Fig. 2-1 (1)	422B13763B 43B35817 43B35818A,B	Cover	For receiver	1 set
(2)	422B13763A 43B35817 43B35818A,B	Cover	For transmitter	1 set
(3)	33E28694B	Cord winder		4
(4)	349B73661	Side handle		1
(5)	34E84192	Side foot		4
(6)	322B7672	Standard foot		4
(7)	349B73667	Stacking foot	Opt - 61	4
(8)	43H35813A 43H35813B	Foot pad	Opt - 61	1 1
(9)	3NPS12B3+SW+WB	Screw		4

Table 2-1 Mechanical Parts List (Cont'd)

No.		Parts No.	Description	Remarks	Qty.
Fig. 2-1	(10)	5FPS30S7	Screw		1
	(11)	5FPS16S7	Screw		1
	(12)	4NPS16B3+SW+WB	Screw		8
	(13)	3NPS10B3+SW+WB	Screw		4
	(14)	5BPS25S3+WB	Screw		1
	(15)	5BPS12S3+WB	Screw		1
	(16)	4NPS10S7+SW	Screw	Opt - 61	4

1. Remove the eight screws (9), (10), (11), (14) and (15) in Fig. 2-1 and lift off the cover (1). (For Receiver)

2. Remove the eight screws (9), (10), (11), (14) and (15) or twelve screws (9), (10), (11), (14), (15) and (16) (for OPT 61) and lift off the cover (2).

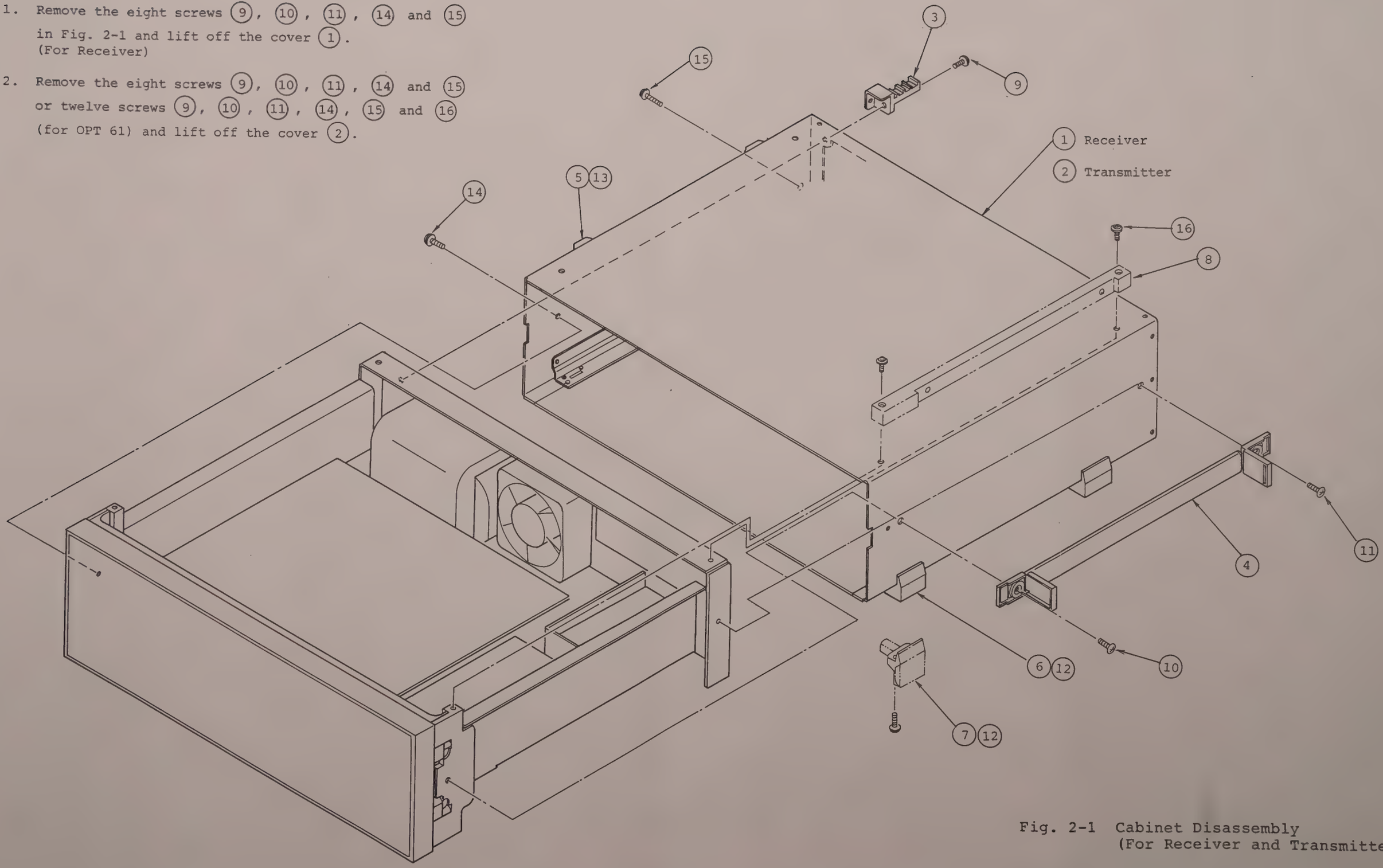


Fig. 2-1 Cabinet Disassembly
(For Receiver and Transmitter)

2.2.2 Transmitter exploded view

Table 2-2 Mechanical Parts List

No.	Parts No.	Description	Remarks	Qty.
Fig. 2-2 (1)	44Y91104A	Front panel		1 set
(2)	43H37160	Bracket		2
(3)	44E68583	Button		1
(4)	422U13834	A2 PC board		1
(5)	432U36046	A5 PC board		1
(6)	442U91223	A6 PC board		1
(7)	3FPS10B3	Screw		3
(8)	3NPS12B3+SW+WB	Screw		4
(9)	3NPS6B3+SW	Screw		18

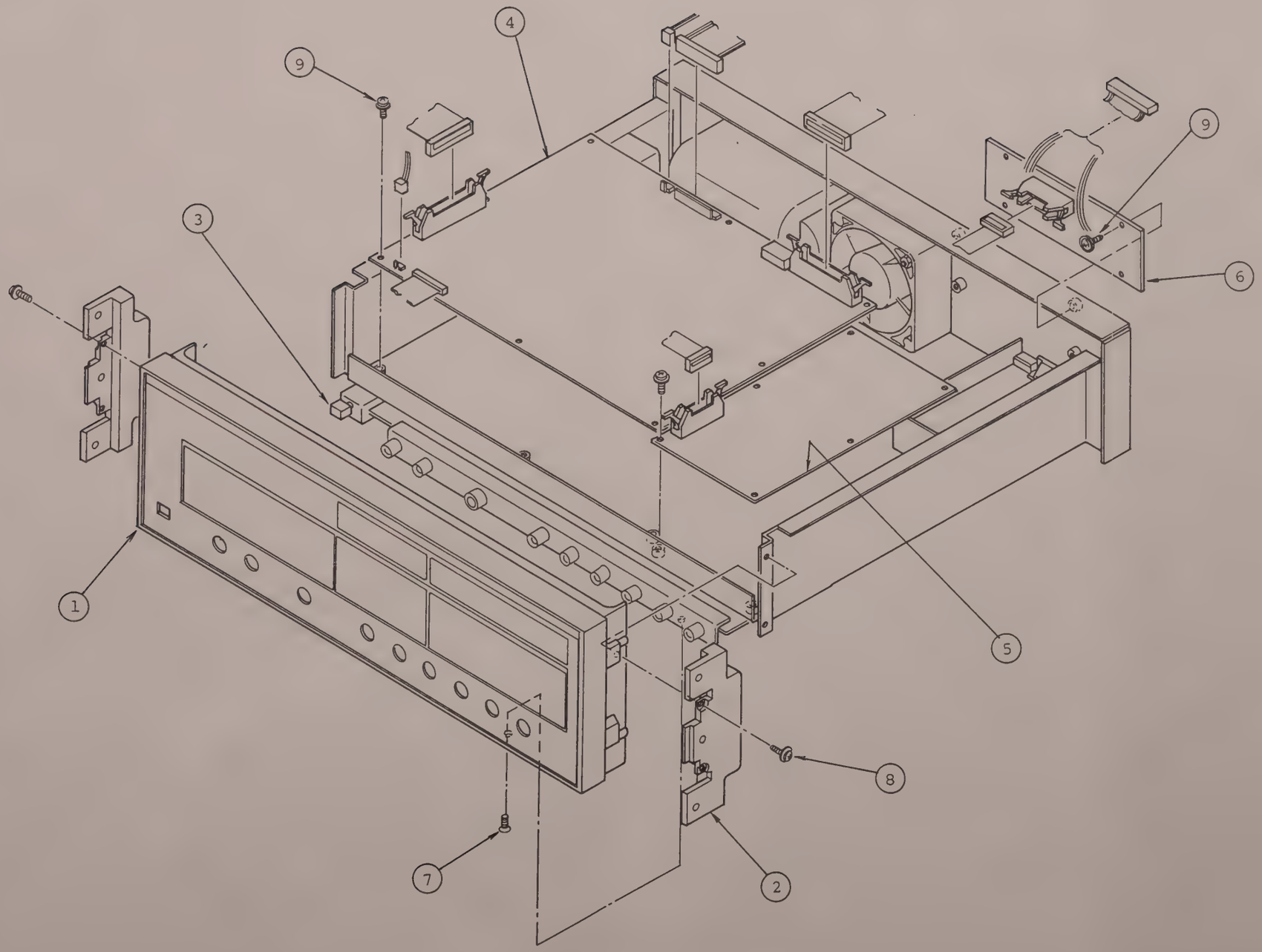


Fig. 2-2 Transmitter Exploded View (Front Panel)

Table 2-3 Mechanical Parts List

No.		Parts No.	Description	Remarks	Qty.
Fig. 2-3	(1)		Rear panel		1
	(2)	422U13911	A4 PC board		1
	(3)	422U13832	A1 PC board		1
	(4)	44Y88128	GP-IB interface	OPT - 41	1
	(5)	34B64690C	Protective mesh cover		1
	(6)				
	(7)	3BPS8S3+WB	Screw		4
	(8)	3NPS8B3+SW+WB	Screw		4
	(9)	3FPS6B3	Screw		4
	(10)	3NPS6B3+SW	Screw		16
	(11)	3FPS10B3	Screw		4

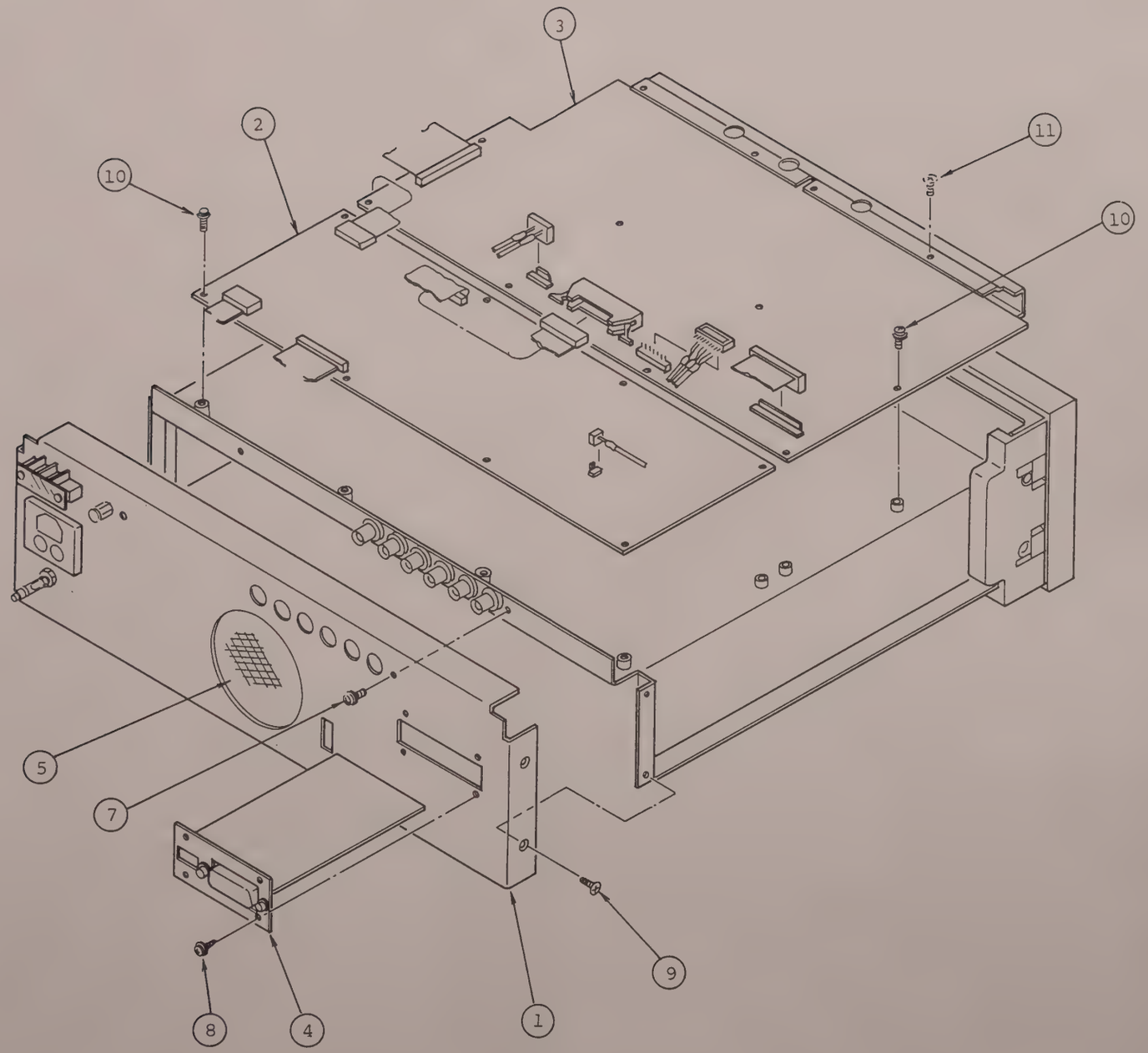


Fig. 2-3 Transmitter Exploded View (Rear Panel)

2.2.3 Receiver exploded view

Table 2-4 Mechanical Parts List

No.	Parts No.	Description	Remarks	Qty.
Fig. 2-4 (1)	44Y91104B	Front panel		1 set
(2)	43H37160	Bracket		2
(3)	44E68583	Button		1
(4)	422U14527	A2 PC board		1
(5)	442U88382	A4 PC board		1
(6)	3FPS10B3	Screw		2
(7)	3NPS12B3+SW+WB	Screw		4
(8)	3NPS6B3+SW	Screw		14

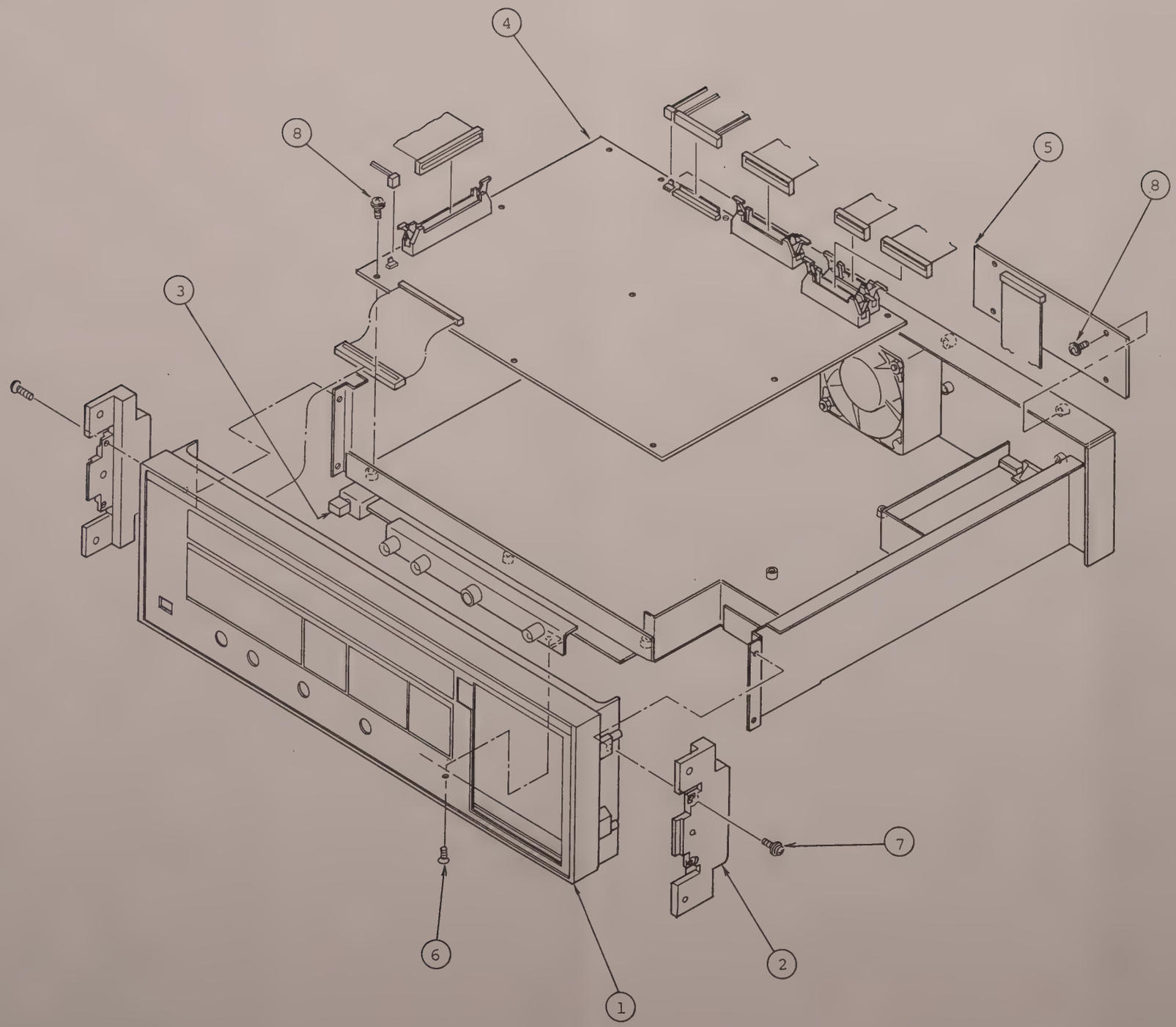


Fig. 2-4 Receiver Exploded View (Front Panel)

Table 2-5 Mechanical Parts List

No.	Parts No.	Description	Remarks	Qty.
Fig. 2-5 (1)	422B13759	Rear panel		1
(2)	422U13913	A5 PC board		1
(3)	422U13838	A1 PC board		1
(4)	44Y88128	GP-IB interface	OPT - 42	1
(5)	34B64690C	Protective mesh cover		1
(6)				
(7)	3BPS8S3+WB	Screw		4
(8)	3NPS8B3+SW+WB	Screw		4
(9)	3FPS6B3	Screw		4
(10)	3NPS6B3+SW	Screw		14
(11)	3FPS10B3	Screw		2
(12)				

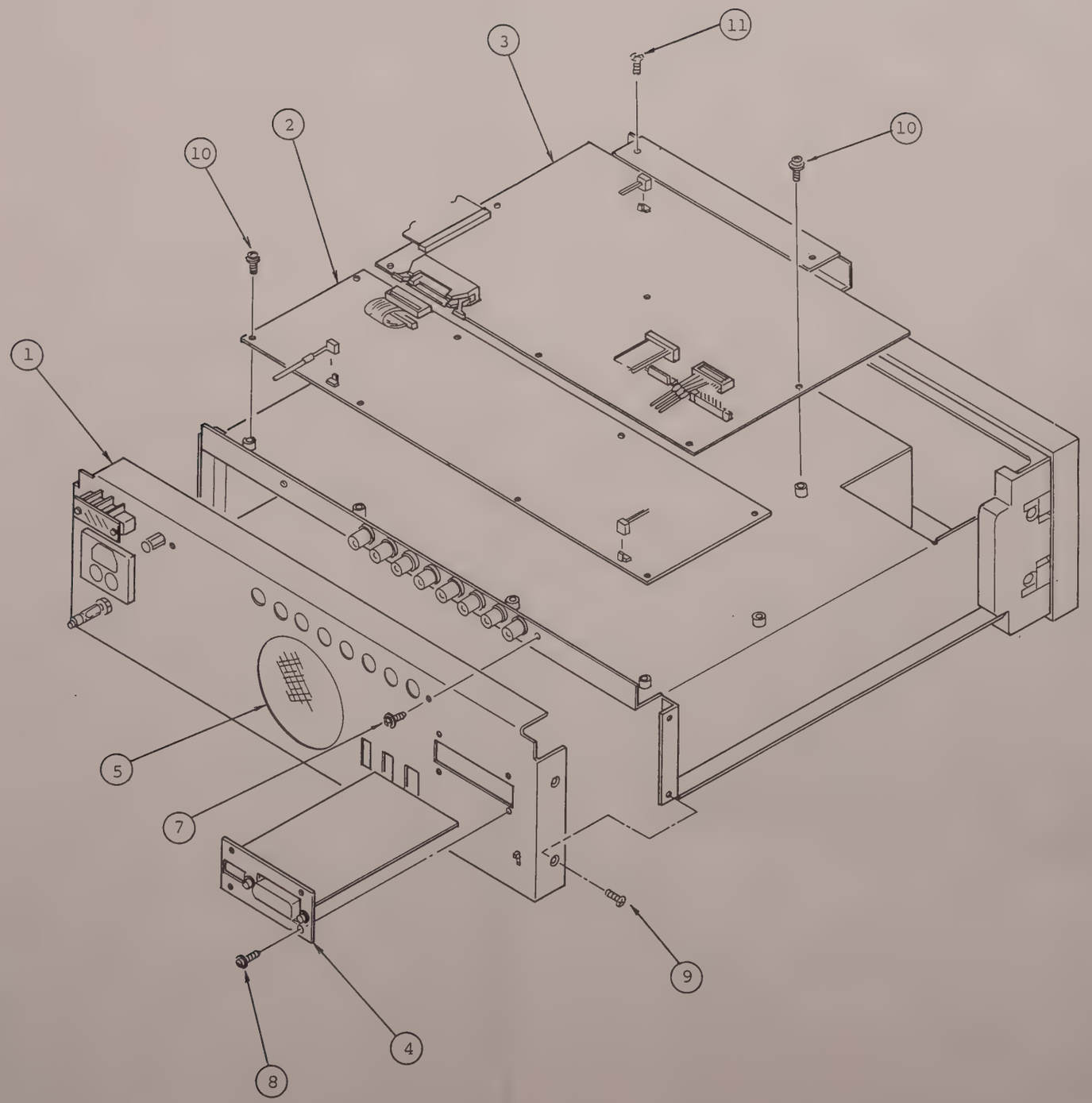


Fig. 2-5 Receiver Exploded View (Rear Panel)

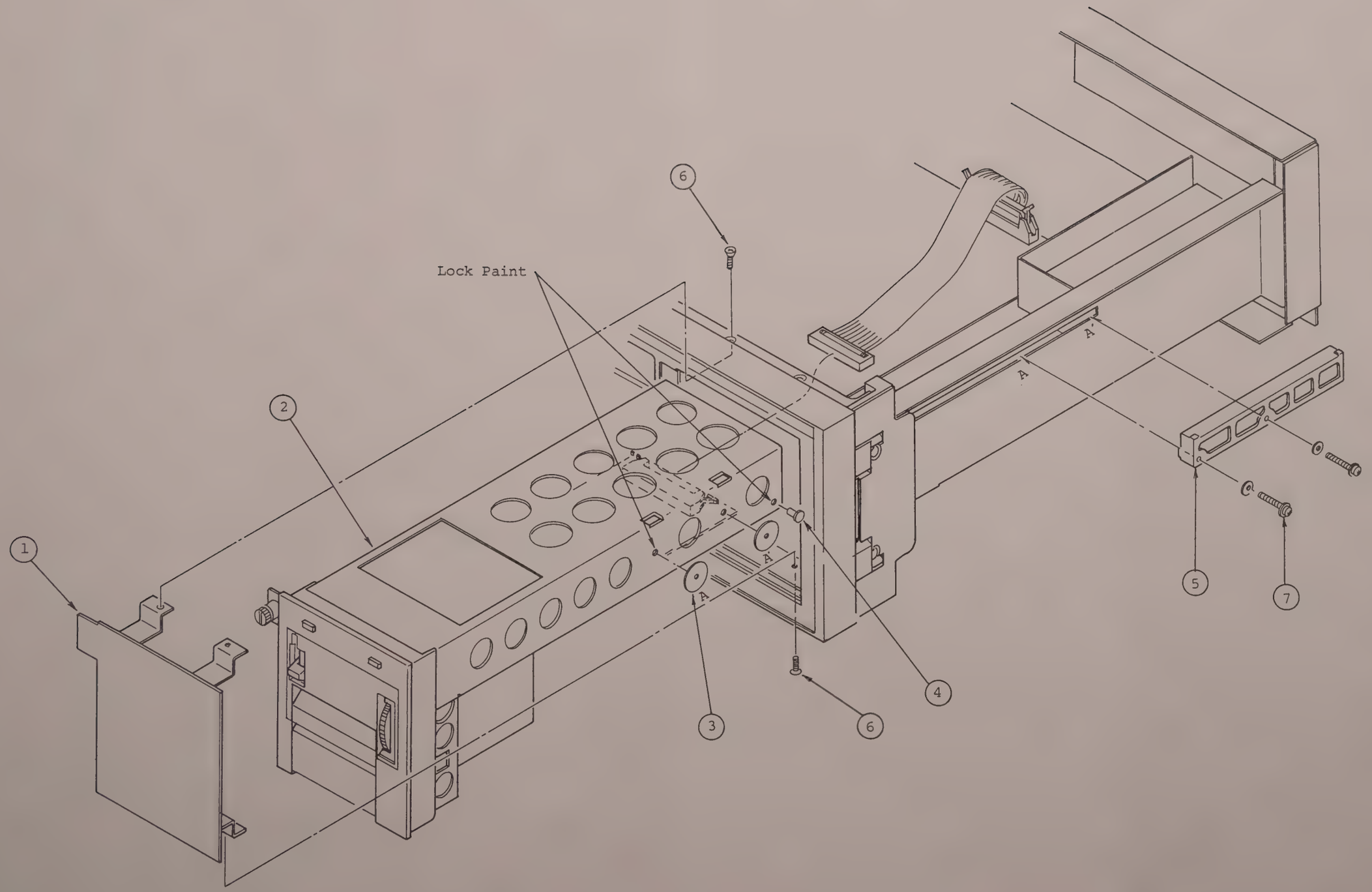


Fig. 2-6 Printer Option 11
Exploded View
(Blank Panel and Printer)

SECTION 3

TROUBLESHOOTING AND ADJUSTMENTS

3.1 Introduction

This section describes how to troubleshoot and adjust the instrument when trouble occurs during measurement or when abnormalities are detected during performance check operations.

This section also explains checking and replacement of parts, principles of operation providing details on circuits, and the equipment necessary to make repairs and adjustments.

Troubleshooting is diagrammed as follows.

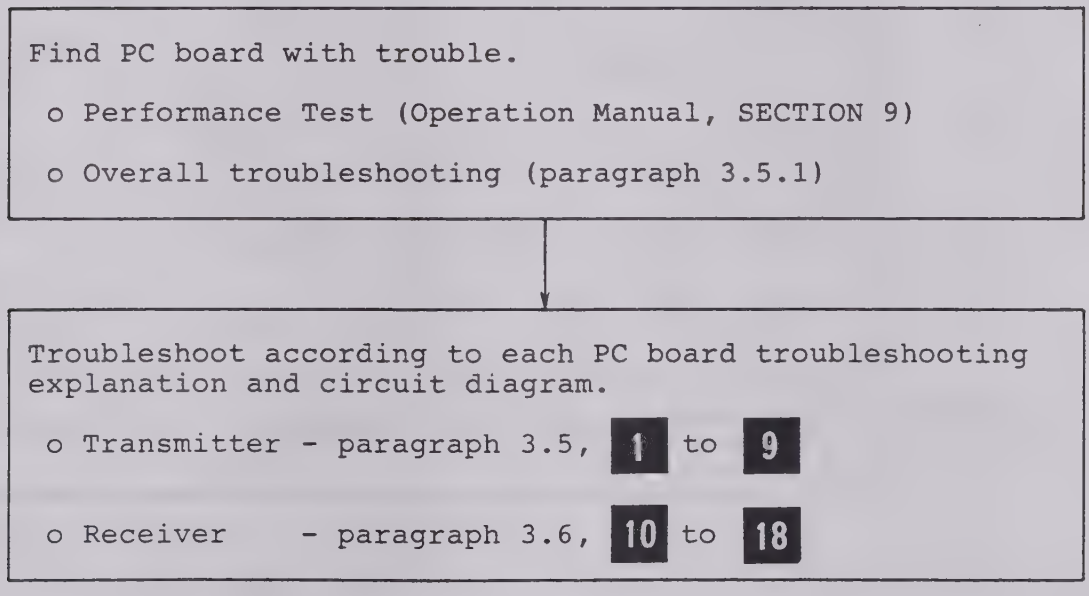

Find PC board with trouble.
o Performance Test (Operation Manual, SECTION 9)
o Overall troubleshooting (paragraph 3.5.1)
Troubleshoot according to each PC board troubleshooting explanation and circuit diagram.
o Transmitter - paragraph 3.5, 1 to 9
o Receiver - paragraph 3.6, 10 to 18

Fig. 3-1 Troubleshooting Procedure

Refer to each PC board circuit diagram and the parts layout for the positions of the test points to be checked when troubleshooting each PC board.

3.2 Checking and Replacing Parts, and Changing AC Power Supply Rating

3.2.1 Explanation of PC board identification markings

As shown in Fig. 3-2, each PC board in the ME3401A has a unified ASSEMBLY number, DRAWING number and REVISION number.

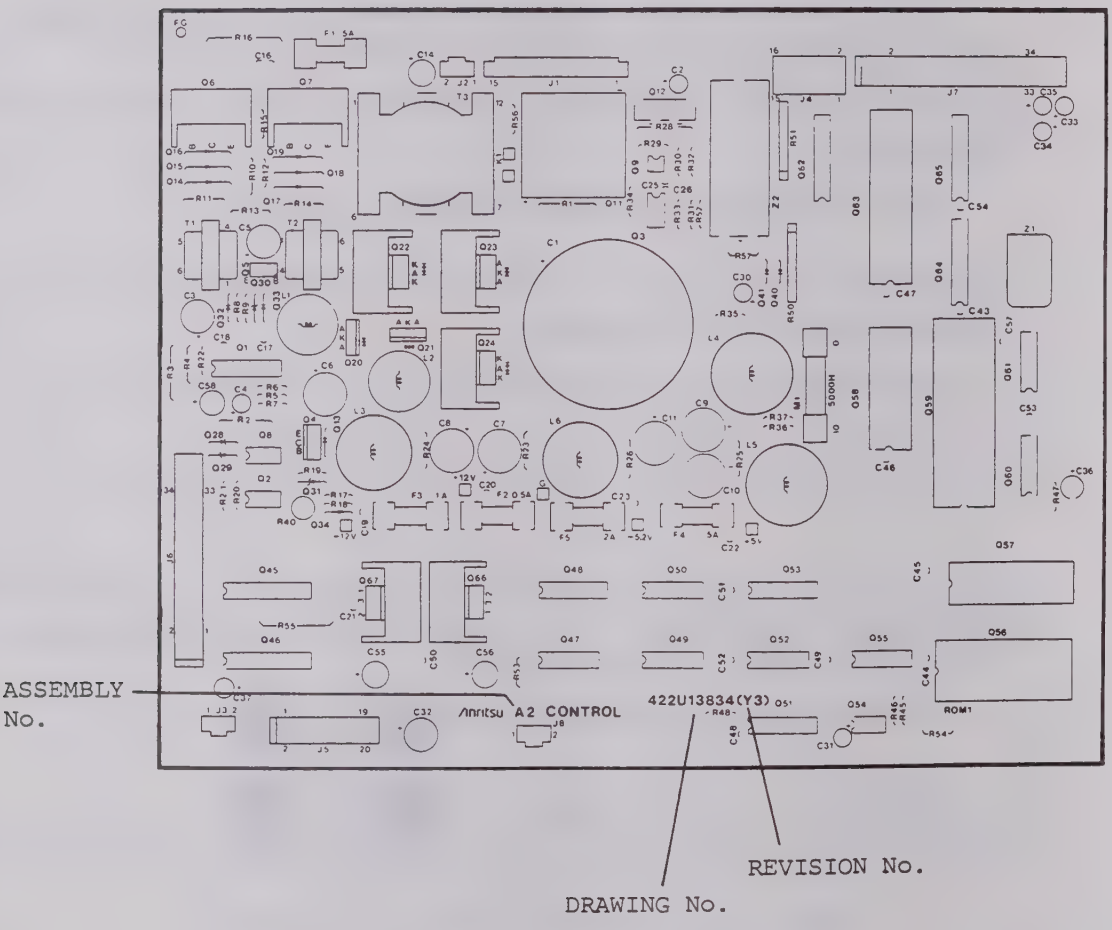


Fig. 3-2 Board Markings

3.2.2 Notes on soldering

(1) Use an ordinary 30- to 40-watt pencil-type soldering iron.

(2) Before using the soldering iron, be sure it is well insulated because leakage current may damage the part.

(3) When removing a soldered part from a circuit board or soldering in a new part, hold the part lead with tweezers to shunt heat.

(4) The tips of major part leads are bent behind the PC board to ensure tight support. To remove a part, first lift up the tips of the leads and then remove the part.

3.2.3 Transistor check

(1) Transistors mounted on PC board

Transistors can be checked for acceptable quality in the operating state by measuring the base and emitter potentials. NPN silicon transistors have a base potential that is 0.6 or 0.7 V higher than the emitter potential. In PNP silicon transistors, the former is 0.6 or 0.7 V lower than the latter. Transistors are faulty if these relationships are not satisfied.

(2) Transistors removed from PC board

Removed transistors can be checked by measuring the resistance between the emitter, base, and collector using a circuit tester. The standard values are given in Table 3-1. This check must be performed at a measuring current of less than 100 μA.

Table 3-1 Resistance Test of Unmounted Transistors

Type of Transistor	Connect Ohmmeter		Resistance
	Positive lead to	Negative lead to	
PNP silicon	Emitter, Collector	Base	1 Ω to 10 kΩ
	Emitter	Collector	Very high
NPN silicon	Base	Emitter, Collector	1 Ω to 10 kΩ
	Emitter	Collector	Very high

3.3 Equipment Required for Troubleshooting and Adjustment

The equipment listed in Table 3-2 and Table 3-3 is recommended for adjustment and troubleshooting. Different test equipment may be used if it meets the required characteristics listed in the table.

Table 3-2 Equipment Required for Troubleshooting and Adjusting ME3401A Transmitter

No.	Name	Major specification
1	Oscilloscope	Frequency band: DC to 300 MHz
2	Frequency counter	Frequency band: 0.01 Hz to 50 MHz
3	DC voltmeter	Meas. range: 0 to 100 V Resolution : 0.01 V
4	Signal generator	Frequency range: 1 to 50 MHz Resolution : 1 kHz
5	Terminator with 20 dB attenuation	Input/Output voltage ratio: 10:1
6	Pulse generator	Frequency range: 1 Hz to 10 MHz Level : TTL
7	Pulse Pattern Generator	Frequency band : 1 to 50 MHz Level : TTL, ECL Impedance : 75 Ω

Table 3-3 Equipment Required for Troubleshooting and Adjusting ME3401A Receiver

No.	Name	Major specification
1	Oscilloscope	Frequency range: DC to 300 MHz
2	Frequency counter	Frequency band: 10 Hz to 50 MHz
3	DC voltmeter	Meas. range: 0 to 100 V Resolution : 0.01 V
4	ME3401A Transmitter	

3.4 Circuit Reference

The PC boards in the ME3401A Transmitter and ME3401A Receiver have A numbers such as A3.

Tables 3-4 and 3-5 list the A numbers, circuit diagram names, PC board DRAWING numbers, and parts list numbers. CIRCUIT DIAGRAM Nos. are the numbers of the circuit diagrams shown in this section.

The parts list is given in SECTION 4.

Table 3-4 ME3401A Transmitter Circuit Reference

Circuit diagram No.	Name	A No.	PC board drawing No.	Parts list No.
1	ME3401A TRANSMITTER	———	———	44W88384
2	T-CONTROL	A2	422U13834	44W88386
3	PATTERN GENERATOR	A1	422U13832	44W88385
4	T-DISPLAY	A3	422U13836	44W88387
5	JITTER MODULATION	A4 (OPT 01)	422U13913	44W88388
6	MODULATION SIGNAL GENERATOR	A5 (OPT 01)	432U36046	44W88408
7	T-SWITCH	A6	442U91223	44W90993
8	GP-IB	A7 (OPT 41)	442U83054	44W83046
9	RS-232C	A8 (OPT 43)	442U83056	44W83047

Table 3-5 ME3401A Receiver Circuit Reference

Circuit diagram No.	Name	A No.	PC board drawing No.	Parts list No.
10	ME3401A RECEIVER	———	———	44W88389
11	R-CONTROL	A2	422U14527	44W91570
12	ERROR DET	A1	422U13838	44W88390
13	R-DISPLAY	A3	422U13842	44W88392
14	JITTER MEASUREMENT	A5 (OPT 02)	422U13911	44W88395
15	R-SWITCH	A4	442U88382	44W88394
16	PRINTER UNIT	A8	———	44W85802
17	PRINTER INTERFACE	Z1 in A8	432U34770	44W85804
18	PRINTER CONTROL	Z2 in A8	442U77432	44W85805
8	GP-IB	A6 (OPT 42)	442U83054	44W83046
9	RS-232C	A7 (OPT 43)	442U83056	44W83047
19	DS-1 OUTPUT	A9 (OPT 03)	442U95076	44W95156

3.5 Transmitter Troubleshooting and Adjustment

3.5.1 Overall troubleshooting 1

(1) Overall circuit description

Figure 3-3 is the transmitter simplified block diagram. The ME3401A transmitter consists of A1 PATTERN GENERATOR, A2 T-CONTROL, A3 T-DISPLAY, A4 JITTER MODULATION, A5 MODULATION SIGNAL GENERATOR, A6 T-SWITCH, A7 GP-IB, and A8 RS-232C.

For the details of each circuit, refer to paragraph 3.5.2 to 3.5.7.

(2) Overall troubleshooting

If a problem is indicated by the performance check (operation manual, SECTION 9), locate the fault by using the following procedures.

[Step 1]

When power switch turned on, POWER-ON lamp comes on?

No

AC operation

- AC power cord not connected to AC power supply
- Rear-panel AC fuse blown
- AC power circuit (A2 and S1) faulty
- LED (Q10-A3) faulty

DC operation

. Abnormal DC supply voltage
  (Specification: -22 to -53 V)

. Connection abnormal between DC power supply and DC input connector

. POWER circuit (A2 and S1) is defective.

. LED (Q10-A3) is defective.

[Step 2]

When each switch on front panel operated, each display (including LEDs) comes on normally?

No

A2 T-CONTROL faulty (paragraph 3.5.2)

A3 T-DISPLAY faulty (paragraph 3.5.4)

[Step 3]

If the internal clock, external clock, pattern, frame, error addition, DS-3 output, DS-1/DS-1C/DS-2 output, unipolar output, and X-bit input are abnormal, the A1 PATTERN GENERATOR is abnormal (paragraph 3.5.3).

[Step 4]

If the JITTER MODULATION is abnormal, either A4 JITTER MODULATION (paragraph 3.5.5) or A5 MODULATION SIGNAL GENERATOR (paragraph 3.5.6) is abnormal, or both are abnormal.

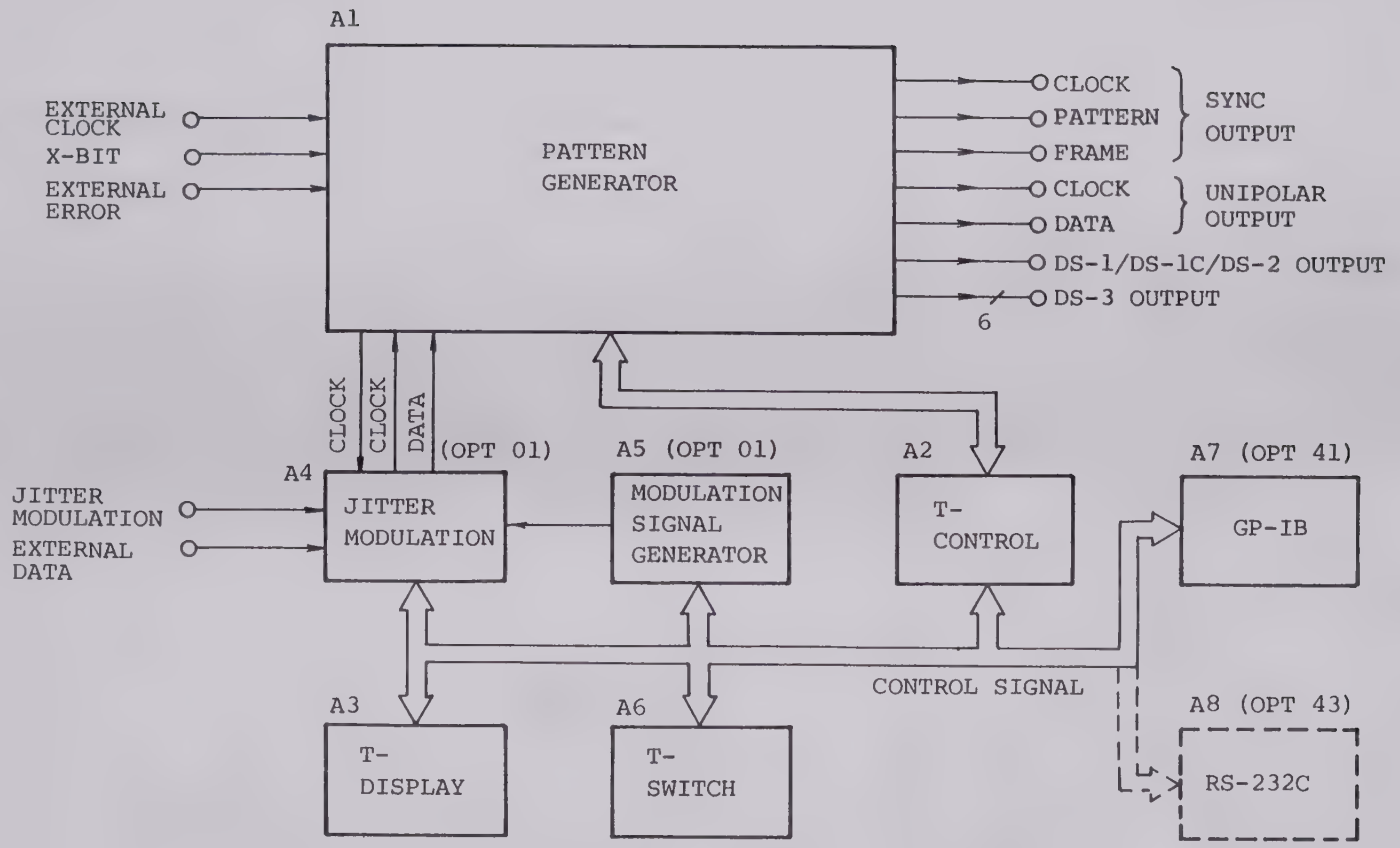


Fig. 3-3 ME3401A Transmitter Simplified Block Diagram

43W36034 1/1

APPLICATION

REVISIONS

AC85~130V 48~63Hz
100VA MAX 2A

POWER ON OFF

Z1 Noise Filter

2A 2A

J19

S1

T1 30V 3A 0V

E1

POWER SOURCE DC AC

S2

DC INPUT -22V/-53V 0V

E2

FAN G1

J1 J2 J3 J7

A2

T-CONTROL 43W36036 2

A3

T-DISPLAY 43W36037 4

A5

6 MODULATION SIGNAL GENERATOR 43W36048 OPT01

A4

5 JITTER MODULATION 43W36038 OPT01

J7 J18

A1

PATTERN GENERATOR 43W36035 3

JITMOD INPUT 4bits/1Vp-p 75Ω

UNIPOLAR OUTPUT CLOCK 75Ω DATA 75Ω

DS-1/DS-1C/DS-2 OUTPUT DS-1/DS-1C 100Ω DS-2 110Ω

DS-3 OUTPUT
1 75Ω
2 75Ω
3 75Ω
4 75Ω
5 75Ω
6 75Ω

EXTERNAL CLOCK INPUT 75Ω
EXTERNAL DATA INPUT 75Ω

SYNC OUTPUT CLOCK TTL 75Ω

FRAME 75Ω PATTERN 75Ω

EXT ERROR INPUT TTL

X-BIT INPUT TTL

A8 RS232C 9 OPT 43

A7 GP-IB 8 OPT 41

W1

A6 T-SWITCH 44W90992 7

EXTERNAL DATA INPUT TTL ECL

EXTERNAL CLOCK INPUT TTL 0.7~1.5Vp-p ECL

UNIPOLAR OUTPUT LEVEL TTL +1/-1V ECL

FUNCTION SWITCH

Parts List 44W88384

DEP

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata
APPROVED BY E. Sugimoto
TRACED BY
DRAWN BY T. Kubota
SCALE :

TITLE DIGITAL TRANSMISSION ANALYZER ME3401A Transmitter Circuit Diagram.

DRAWING No. 43W36034 1/1

1

No. D023·1985.08

ANRITSU CORP.

3-13/3-14

3.5.2 A2 T-CONTROL PC board 2

(1) Circuit description

A2 T-CONTROL consists of the front switches, display, circuits, GP-IB and RS-232C control circuits, and +5, +12, -5.2, and -12 V power circuits.

(2) Troubleshooting

[Step 1]

Check waveform between ❶ and ground using an oscilloscope.

The waveform shown in Fig. 3-4 is normal. Also, check the frequency at ❶ using a frequency counter.

A frequency of 4.000 MHz is normal.

If both the waveform and frequency are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to Z1, Q61, and Q60.

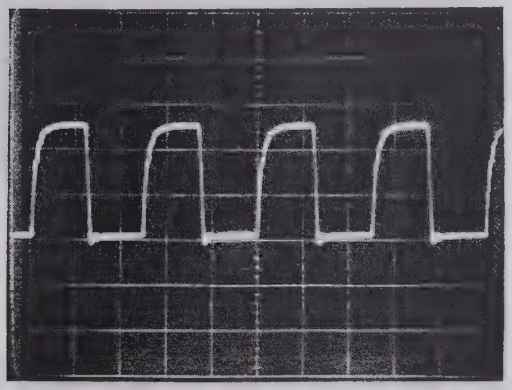


Fig. 3-4 Waveform at ❶

[Step 2]

Check the voltage between ❷ , ❸ and ground using an oscilloscope. If it is within the range of +3 to +5.5 V, it is normal. If it is normal, proceed to the next step. If it is abnormal, troubleshoot the circuits related to ❷ and ❸ .

[Step 3]

Check the waveform between ❹ and ground using an oscilloscope. The waveform shown in Fig. 3-5 is normal. If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ❹ .

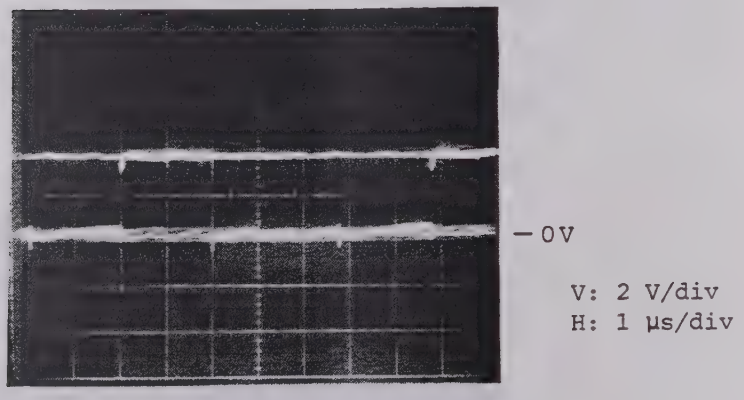


Fig. 3-5 Waveform at ❹

[Step 4]

Check the voltage between ❺ and ground using a DC voltmeter. A voltage within the range of +2.5 to +4 V it is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to Z2 and R57.

[Step 5]

Check the waveform between ❻ and FG using an oscilloscope.

The waveform shown in Fig. 3-6 is normal.

Also, check that the voltage between ❻ and FG is within the range of +30 to +50 V (at AC operation).

If both the waveform and voltage are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to ❻.

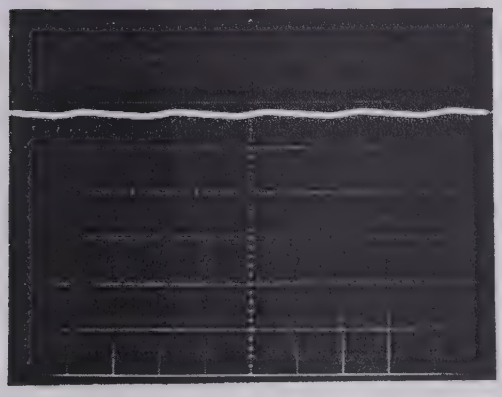


Fig. 3-6 Waveform at ❻

[Step 6]

Check the voltage between ❼ and FG using a DC voltmeter.

A voltage within the range of +13 to +18 V is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ❼ .

[Step 7]

Check the waveform between ❽ and FG using an oscilloscope.

The waveform shown in Fig. 3-7 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ❽ .

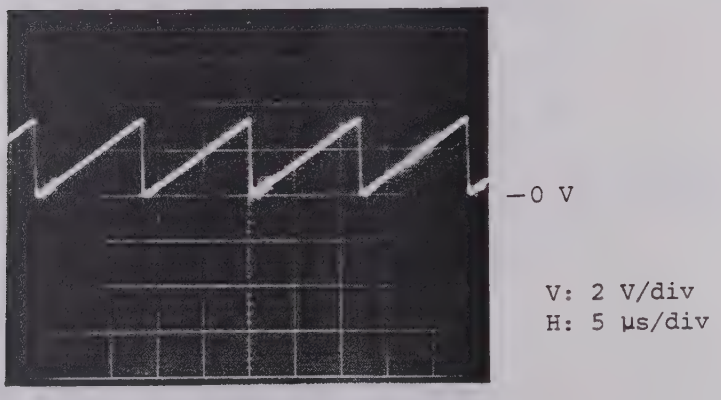


Fig. 3-7 Waveform at ❽

[Step 8]

Check the waveforms between ❾ , ❿ and FG using an oscilloscope. The waveform shown in Fig. 3-8 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❾ and ❿ .

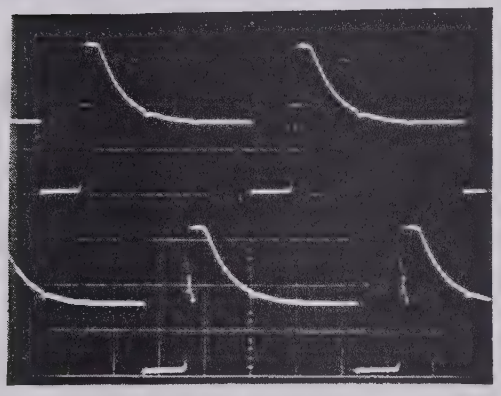


Fig. 3-8 Waveforms at ❾ and ❿

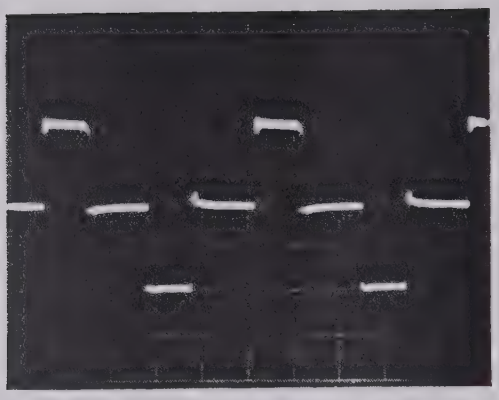
[Step 9]

Check the waveform between ⓫ and FG using an oscilloscope.

The waveform shown in Fig. 3-9 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ⓫ .



V: 20 V/div

H: 5 µs/div

Fig. 3-9 Waveform at ⓫

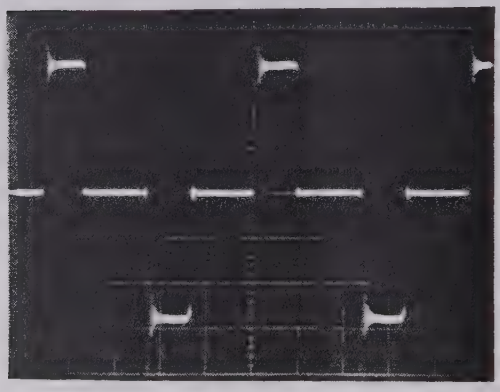
[Step 10]

Check the waveform between ⓬ and FG using an oscilloscope.

The waveform shown in Fig. 3-10 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ⓬.



V: 5 V/div

H: 5 µs/div

Fig. 3-10 Waveform at ⓬

[Step 11]

Check the voltage between ⑯ and ground using a DC voltmeter.

A voltage within the range of -5.0 to -5.5 V is normal.

If it is normal, proceed to the next step.

If it is abnormal, adjust R40.

If it is still abnormal, troubleshoot circuits ⑫ to ⑯ and ⑰ to ⑮ and the circuits related to R40.

[Step 12]

Check the voltage between ⑬, ⑭, ⑮, and ground using a DC voltmeter.

Test Point	Voltage range
⑬	+4.8 V to +5.5 V
⑭	-11.4 V to -12.6 V
⑮	+11.4 to +12.6 V

A voltage within the above range is normal and A2 is normal.

If it is abnormal, troubleshoot the circuits related to ⑬, ⑭, and ⑮.

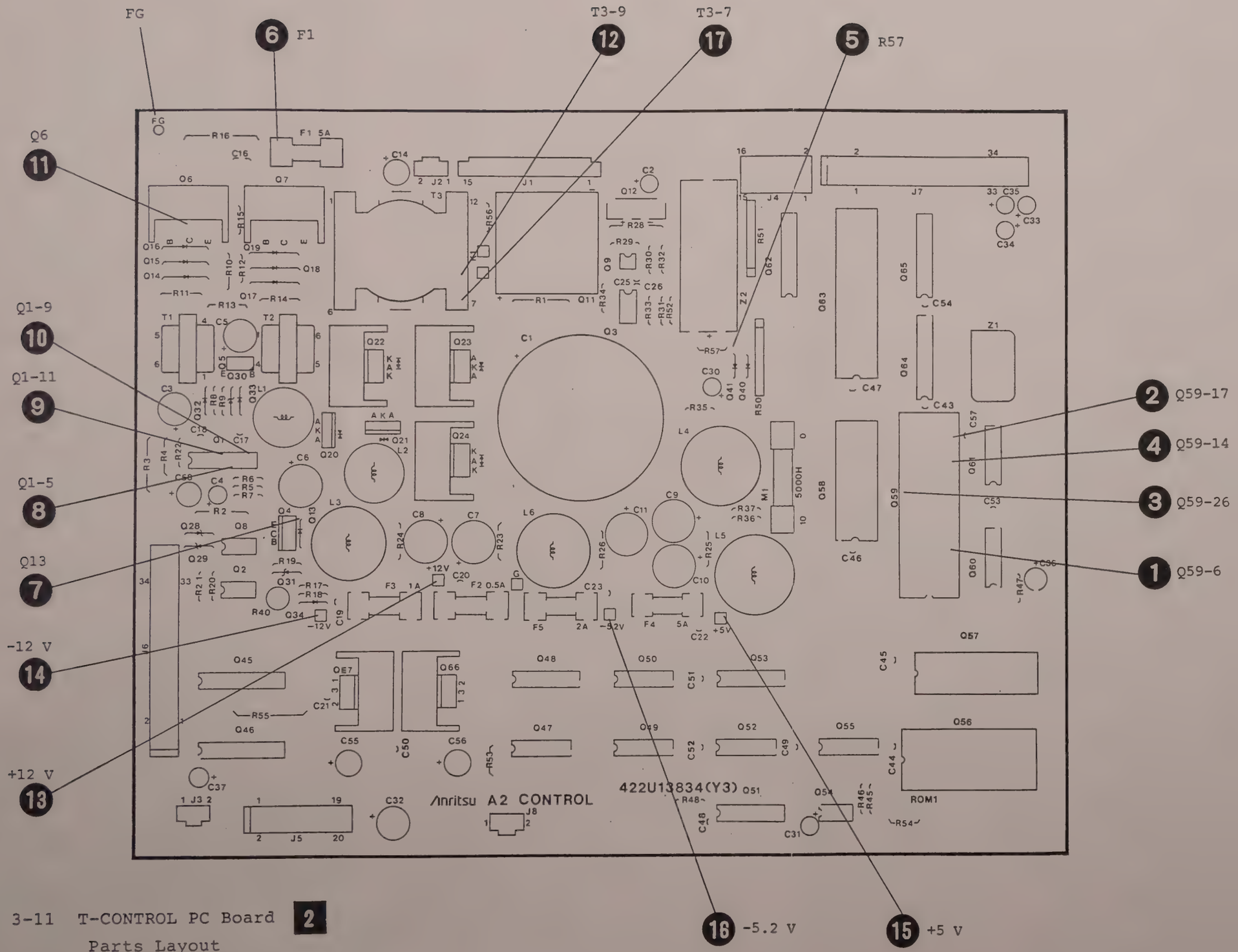


Fig. 3-11 T-CONTROL PC Board 2
Parts Layout

APPLICATION

REVISIONS

C43 0.1 +5V Q59 μPD780C-2

Q47 74LS14 — BUSRQ, WAIT, NMI

C48 0.1, R48 100k, C57 1000p

Q51 74LS123 (MS, R)

Q54 MB3771 (RESIN, RESET, Vs)

R45 2.74k, R46 1.0k, C31 2.2, R54 10k

Q55 TC74HC00AP — RESET, RAMHLD

Z1 8MHz, Q61 74LS74, Q60 7437, R47 150

½ CLKB, ½ CLKA

Q52 74LS04 — INTR, INT

Q48 74LS139 — RAM, RMT, IRQ, IO, DISP, CNT, IO1, IO2

Q50 74LS32, Q49 74LS74 — INTA

Q53 74LS155 — RD, WR, IORQ, MREQ, M1

Q64 74LS245

Q56 EPROM32Kx8-20C

Q57 HM6264ALP-15 — RAMHLD, RAM, WE, OE, CS1, CS2

MEMWR, MEMRD

Q40 1S953, Q41 1S953, R57 1k, Z2 3V, C30 2.2 — BAT, RESET

422U13834

Parts List 44W88386

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata — TRACED BY — SCALE :

APPROVED BY E. Sugimoto — DRAWN BY T. Kubota

TITLE A2 T-CONTROL Circuit Diagram (Transmitter)

DRAWING No. 43W36036 1/3

DEP

No. 0023-1985.08

ANRITSU CORP.

3-23/3-24

APPLICATION

REVISIONS

(GP-IB/RS-232C)

(T-DISPLAY)

(PATTERN GENERATOR)

(T-SWITCH)

Q62 74LS245

Q65 74LS244

Q45 74LS244

Q46 74LS245

Q47 74LS14

Q58 μPD8259AC-2

Q63 μPD71055C-10

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata — TRACED BY — SCALE :

APPROVED BY E. Sugimoto — DRAWN BY T. Kubota

TITLE A2 T-CONTROL Circuit Diagram. (Transmitter)

DRAWING No. 43 W36036 2/3

DEP

ANRITSU CORP.

43W36036 3/3

APPLICATION

REVISIONS

(G1 FAN) (S1 SW)

J2 +12V C14 220 Q5 2SA1154

J3

→ Q63-25(2/3)

J1 F1 5A

R3 3.3k R4 100 Q4 2SC3179

R2 3.3k Q29 RD13E

J5-19 (2/3)

Q28 RD5.1E

J5-20 (2/3)

F6

R9 1k R8 680 Q30 RD2.7E

Q13 V03G

C3 220

Q1 μPC494C

C18 0.1 R22 4.7k

R7 3.3k C4 47 R6 330 C17 1000P R5 12k

R1 4.7k C1 10000

Q11 D5FB20

C5 220 Q32 1S955 Q33 1S955

T1 T2

R11 10 R10 47 R12 100

R13 47 R14 10 R15 100

Q16 V19E-1 Q15 V19E-1 Q14 V19E-1 Q6 2SC3220

Q17 V19E-1 Q18 V19E-1 Q19 V19E-1 Q7 2SC3220

R16 220 C58 47 C16 1000P

T3

C6 680 L1 650μH

Q20 D5LC20U-4000

L2 650μH Q21 D8LC20U-4000

F2 0.5A Q66 μPC1431/2H +12V

C7 1000 R23 1k C20 0.1 C56 330

+12V (0.4A)

Q22 D8LC20UR-4000

C8 1000 R24 1k C21 0.1 C55 330

L3 550μH F3 1A R55 3.3 Q67 μPC1631/2H

−12V (0.8A)

L4 100μH L5 100μH F4 5A +5V

Q23 D10SC4M

C9 1500 C10 1500 R25 100 C22 0.1

+5V (4.5A)

R17

Q24 D10SC4MR C11 1500 R26 100 C23 0.1

L6 140μH F5 2A

−5.2V (1.5A)

Q34 −5.2V

R28 3.3k R30 4.7k

C2 10 R29 330 Q9 PC817X

Q12 RB-152-LFB

K1 R56 220

R17 1.2k R19 470 R20 10k

R40 200 R18 620 Q34 1S953

C19 0.1 Q31 RD2.7E

Q8 PC618 R21 220

Q2 μPC1251C

Q3 μPC393C C26 0.1 R52 10k

C25 0.1 R34 100k R33 10k R31 2.2k R32 2.2k

+5V ← Q47, Q49, Q50, Q52, Q55, Q60, Q61 — 14
Q48, Q51, Q53 — 16
Q45, Q46, Q62, Q64, Q65 — 20

Q47, Q49, Q50, Q52, Q55, Q60, Q61 — 7
Q48, Q51, Q53 — 8
Q45, Q46, Q62, Q64, Q65 — 10

Q47-11 (1/3) → C11

DEP

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata — TRACED BY — SCALE :

APPROVED BY E. Sugimoto — DRAWN BY T. Kubota

TITLE A2 T-CONTROL Circuit Diagram. (Transmitter)

DRAWING No. 43W36036 3/3

2

ANRITSU CORP. 3-27/3-28

No. 0023-1985.08

3.5.3 A1 PATTERN GENERATOR PC Board 3

(1) Circuit description

Figure 3-12 shows the block diagram of this circuit.

A1 PATTERN GENERATOR circuit consists of the CLOCK SIGNAL GENERATOR circuit, PATTERN/FRAME GENERATOR circuit, ERROR ADDITION circuit, CODE CONVERTER circuit, U/B CONVERTER circuit, DELAY circuit and UNIPOLAR OUTPUT circuit.

The CLOCK GENERATOR circuit generates four internal clock (44.736, 6.312, 3.152 and 1.544 MHz) and selects one clock signal from the four internal clocks and one external clock signal (1 to 50 MHz).

The PATTERN/FRAME GENERATOR circuit and generates a pattern (PRBS, 1111, 1100, 1010, 1000) and frame corresponding to each bit rate.

The ERROR ADDITION circuit divides the clock signal, generates an error pulse and adds a 1-bit error to the NRZ signal. For an external error, a 1-bit error or burst error is added.

The UNIPOLAR OUTPUT circuit shapes the waveform of the NRZ pattern signal and clock signal and outputs them after level conversion (TTL, +/-1 V, or ECL). The number of outputs is one system for each clock signal and data signal.

The CODE CONVERTER circuit converts the NRZ pattern sginal to the signal that has the code corresponding to each bit rate (B3ZS for DS-3, B6ZS for DS-2, and B8ZS for DS-1) and branches the converted signal into + and - routes.

The UNIPOLAR to BIPOLAR CONVERTER circuit converts the branched NRZ signal to the RZ signal and bipolar signal, and outputs the converted signal. The DS-3 signal is output to six unbalanced output connectors. For each output, the phase is delayed by 3 bits in order No.1 to No.6 in the DELAY circuit.

The DS-1/DS-1C/DS-2 signal is output to one balanced output connector.

The clock, pattern, and frame are output synchronously.

The clock signal is output to the A4 JITTER MODULATION circuit and the modulated clock signal and external data signal are input from the A4 JITTER MODULATION circuit.

There is also an X-bit input signal.

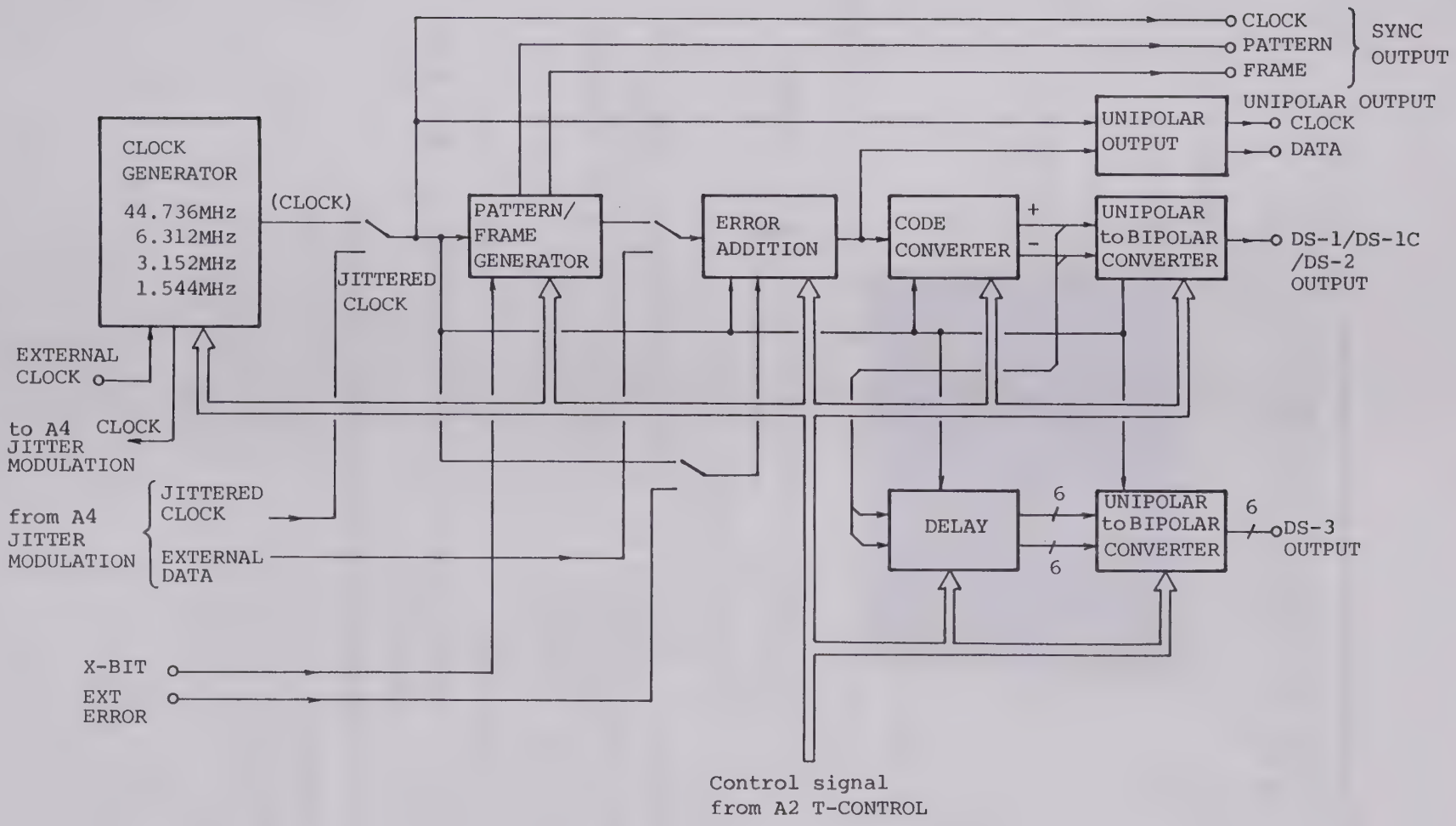


Fig. 3-12 A1 PATTERN GENERATOR Block Diagram

(2) Troubleshooting and adjustment

(a) Checking DS-3 output

Panel setting

CLOCK	: DS-3
JITTER MODULATION	: OFF
DS-3 LEVEL	: HIGH
FUNCTION SWITCH (Rear panel): All "0"	

[Step 1]

Check the waveform at ❶ using an oscilloscope.

The waveform shown in Fig. 3-13 is normal. Also, check the frequency at ❶ using a frequency counter.

A frequency within the range of 44.735560 to 44.736440 MHz is normal. If it is normal, proceed to the next step. If it is abnormal, make the following adjustment.

Adjustment

1. Adjust R45 so that the waveform at ❶ is as shown in Fig. 3-13.
2. Adjust C15 to match the frequency.

If the frequency is abnormal even after the above adjustments ❶ and ❷ have been made, troubleshoot the circuits related to X1 to ❶.

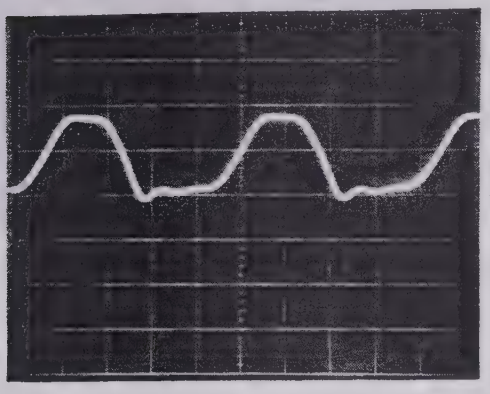


Fig. 3-13 Waveform at ❶ (DS-1)

CAUTION

When waveforms are observed using an oscilloscope, accurate waveforms cannot be observed unless the oscilloscope probe earth lead is connected to the nearest earth point to the measuring point.

[Step 2]

Check the waveform at ❻ using an oscilloscope.

The waveform shown in Fig. 3-14 is normal.
If it is normal, proceed to the next step.
If it is abnormal, troubleshoot the circuits related to ❶ to ❻.

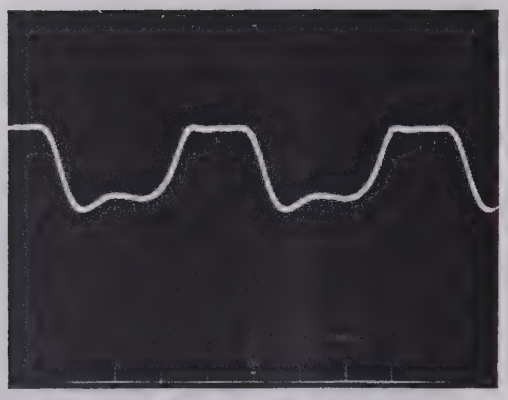


Fig. 3-14 Waveform at ❻

[Step 3]

Check the waveforms and phases at ❽ and ❿ using an oscilloscope. The waveform and phase shown in Fig. 3-15 are normal.

If they are normal, proceed to the next step. If they are abnormal, troubleshoot the circuits related to ❶ to ❿ and Q101.

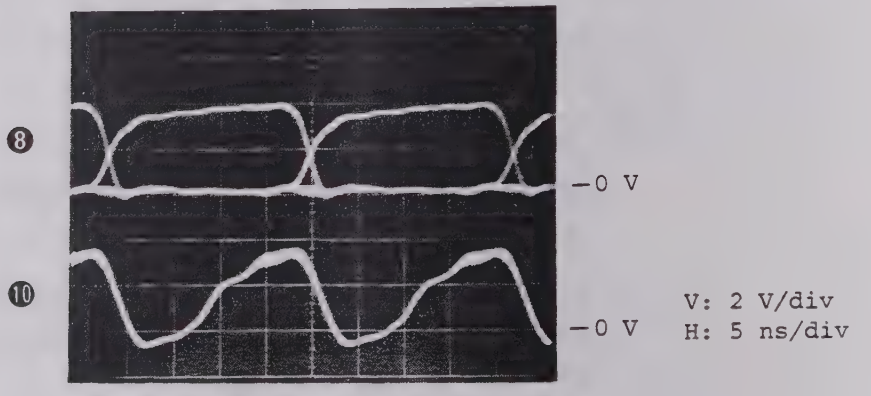


Fig. 3-15 Waveforms at ❽ and ❿

[Step 4]

Check the waveforms and phases at ⑯ and ⑰ using an oscilloscope. The waveform and phase shown in Fig. 3-16 are normal. If they are normal, proceed to the next step. If they are abnormal, make the following adjustment.

Adjustment

Adjust R47, R48, and R49 so that the waveform at ⑯ is as shown in Fig. 3-16. If it is not normal after the above adjustment has been made, troubleshoot the circuits related to ❶ to ⑯, Q121 to Q122, Q119 to Q120, and Q119 to Q118.

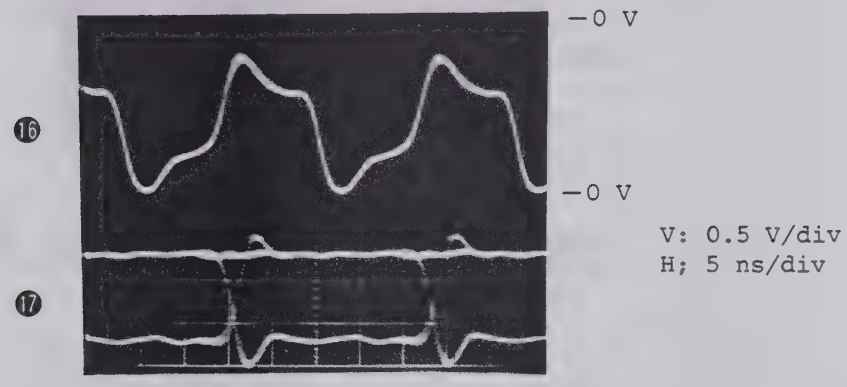


Fig. 3-16 Waveforms at ⑯ and ⑰

[Step 5]

Check the waveforms at ⑱ and ⑲ using an oscilloscope pribe. The waveforms shown in Fig. 3-17 are normal. If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to Q122 to Q110, Q120 to Q109, and Q118 to Q107.

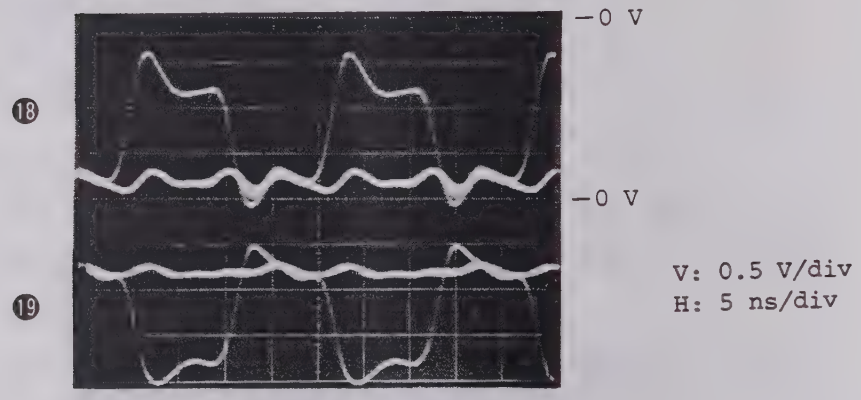


Fig. 3-17 Waveforms at ⑱ and ⑲

[Step 6]

Check the DS-3 output waveform. Set-up shown in Fig. 3-18.

The waveform shown in Fig. 3-19 is normal.

If it is normal, the DS-3 output waveform is normal.

If it is abnormal, make the following adjustment.

Adjustment

Adjust the level.

Table 3-6 DS-3 OUTPUT Adjustment

DS-3 OUTPUT	LEVEL		DUTY	
	+Pulse	-Pulse	+Pulse	-Pulse
1 (J8)	R281	R282	R390	R391
2 (J9)	R283	R284	R392	R393
3 (J10)	R285	R286	R394	R395
4 (J11)	R287	R288	R396	R397
5 (J12)	R289	R290	R398	R399
6 (J13)	R291	R292	R400	R401

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to J8 to J13.

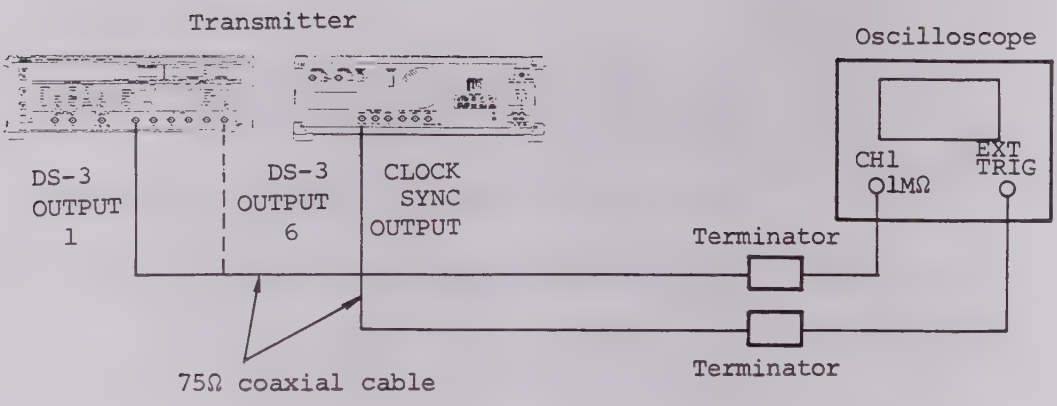


Fig. 3-18 Setup

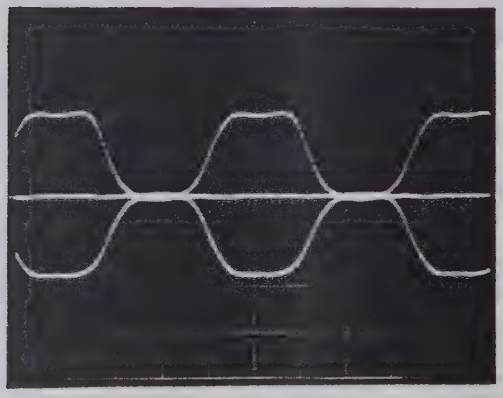


Fig. 3-19 DS-3 OUTPUT

(b) Checking DS-2 output

Panel setting

CLOCK : DS-2
JITTER MODULATION: OFF
FUNCTION SWITCH A (Rear Panel): All "0"

[Step 1]

Check the waveform at ❶ using an oscilloscope.

The waveform shown in Fig. 3-20 is normal.

Also, check the frequency at ❶ using the frequency counter.

A frequency in the range of 6.311937 to 6.312063 MHz is normal.

If it is normal, proceed to the next step.

If the frequency is abnormal, make the following adjustement.

Adjustment

Adjust C16 to match the frequency.

If the frequency is abnormal after the above adjustment has been made, troubleshoot the circuits related to X2 to ❶ .

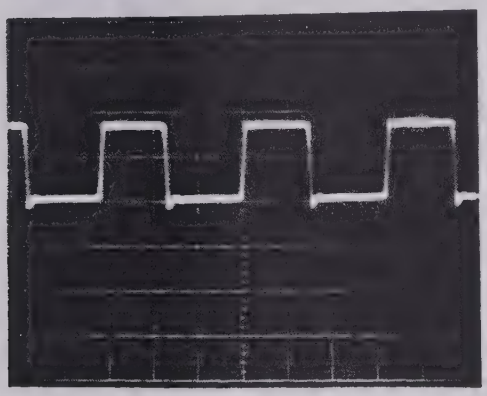


Fig. 3-20 Waveform at ❶

[Step 2]

Check the waveforms at ⑭ and ⑮ using an oscilloscope. The waveforms shown in Fig. 3-21 are normal. If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ① to ⑭ and ① to ⑮.

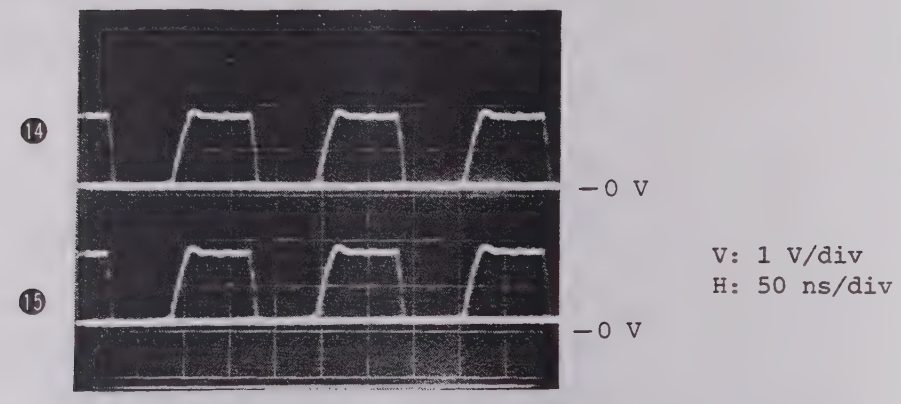


Fig. 3-21 Waveforms at ⑭ and ⑮

[Step 3]

Check the DS-2 output waveform. Set-up as shown in Fig. 3-22.

The waveform shown in Fig. 3-23 is normal.

If it is normal, DS-2 is normal.

If it is abnormal, make the following adjustment.

Adjustment

Adjust the output level at R294 while checking the output waveform.
If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to ⑭ and ⑮ to J7.

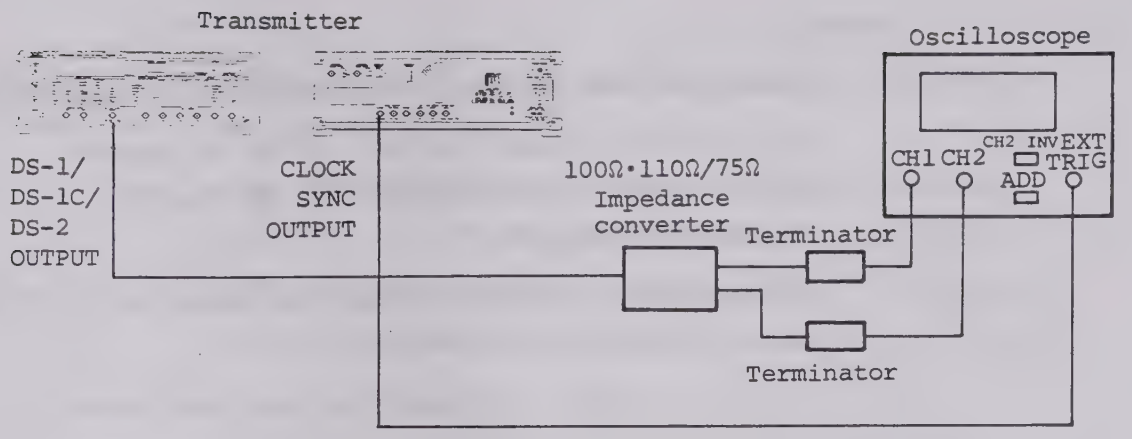


Fig. 3-22 Setup

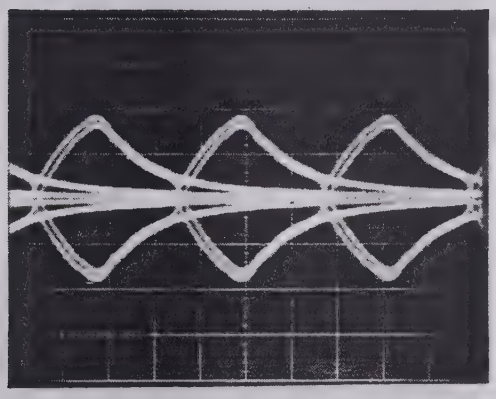


Fig. 3-23 DS-2 OUTPUT

(c) Checking DS-1C output

Panel setting

CLOCK	: DS-1C
JITTER MODULATION:	OFF
FUNCTION SWITCH A (Rear Panel):	All "0"

[Step 1]

Check the waveform at ❶ using an oscilloscope.

The waveform shown in Fig. 3-24 is normal. Also, check the frequency at ❶ using a frequency counter.

If the frequency is within the range of 3.151969 to 3.152031 MHz is normal.

If it is normal, proceed to the next step.

If the frequency is abnormal, make the following adjustment.

Adjustemnt

Adjust C17 to match the frequency.

If the frequency is abnormal after the above adjustment has been made, troubleshoot the circuits related to X3 to ❶.

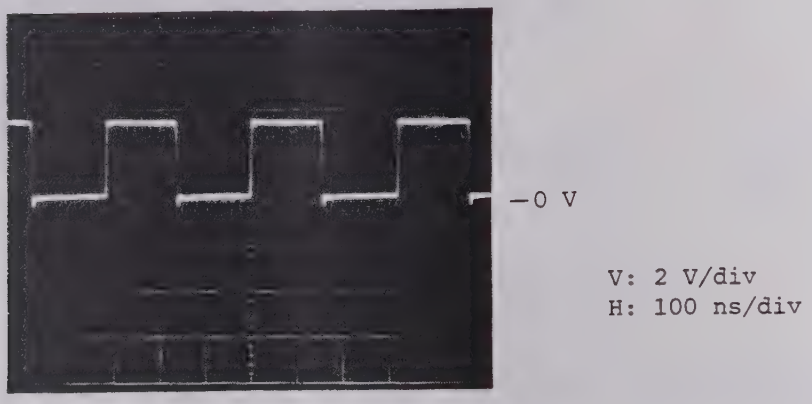


Fig. 3-24 Waveform at ❶

[Step 2]

Check the waveforms at ⓮ and ⓯ using an oscilloscope.

The waveforms shown in Fig. 3-25 are normal.
If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to ❶ to ⓮ and ⓯.

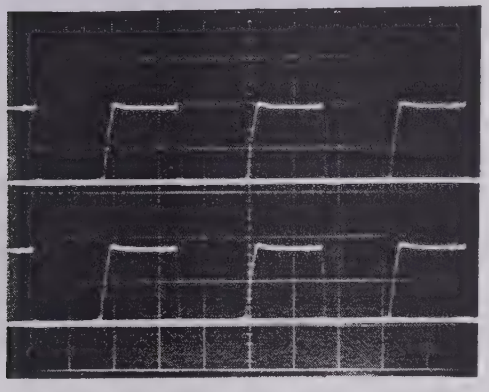


Fig. 3-25 Waveforms at ⓮ and ⓯

[Step 3]

Check the DS-1C output waveform.

Connect as shown in Fig. 3-22.

The waveform shown in Fig. 3-26 is normal.
If the waveform is normal, DS-1C is normal.

If it is abnormal, make the following adjustment.

Adjustment

Adjust the output level at R293 while checking the output waveform.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to ⓮ and ⓯ to J7.

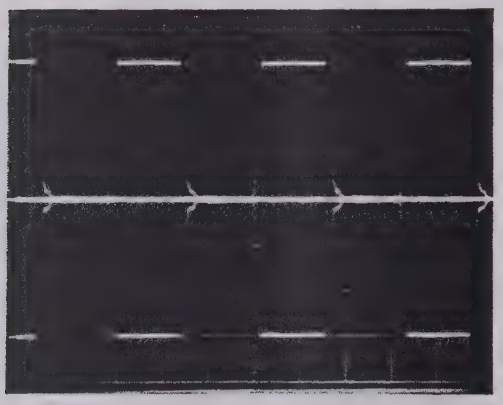


Fig. 3-26 DS-1C OUTPUT

(d) Checking DS-1 output

Panel setting

CLOCK : DS-1
JITTER MODULATION: OFF
FUNCTION SWITCH A (Rear panel): All "0"

[Step 1]

Check the waveform at ❶ using an oscilloscope probe.

The waveform shown in Fig. 3-27 is normal.

Also, check the frequency at ❶ using a frequency counter.

A frequency in the range of 1.543985 to 1.544015 MHz is normal.

If it is normal, proceed to the next step.

If the frequency is abnormal, make the following adjustment.

Adjustment

Adjust C18 to match the frequency.

If the frequency is abnormal after the above adjustment has been made, troubleshoot the circuits related to X4 to ❶ .

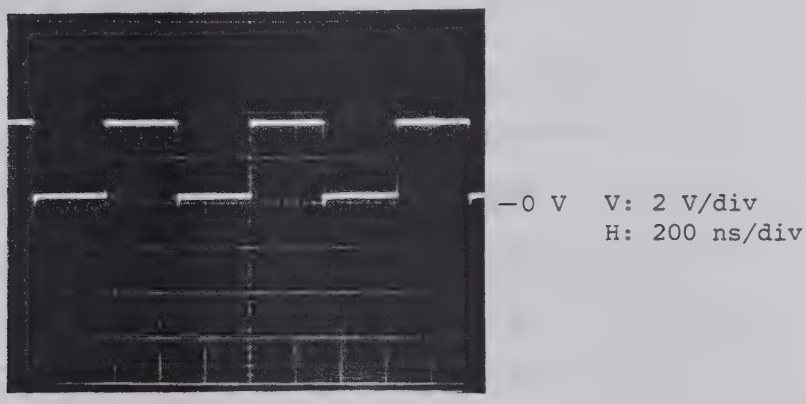


Fig. 3-27 Waveform at ❶

[Step 2]

Check the waveforms at ⓮ and ⓯ using an oscilloscope.

The waveform shown in Fig. 3-28 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits 1 to ⓮ and ⓯.

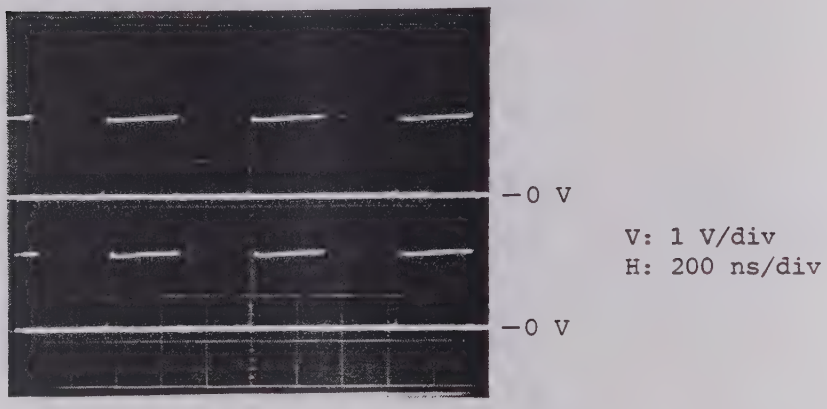


Fig. 3-28 Waveforms at ⓮ and ⓯

[Step 3]

Check the DS-1 output waveform.

Set-up as shown in Fig. 3-22.

The waveform shown in Fig. 3-29 is normal.

If the waveform is normal, DS-1 is normal.

If it is abnormal, make the following adjustment.

Adjustment

Adjust the output level at R293 while checking the output waveform.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to ⓮, ⓯ to J7.

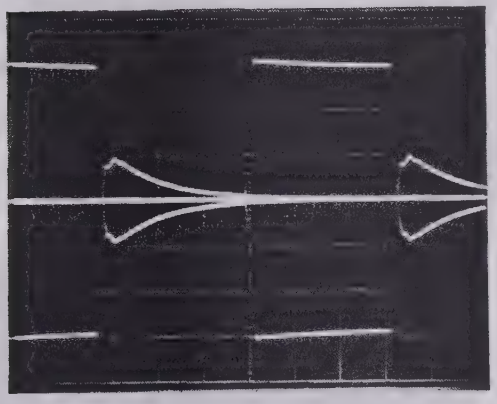


Fig. 3-29 DS-1 OUTPUT

(e) Checking unipolar output

Panel setting

CLOCK	: DS-3
JITTER MODULATION:	OFF
UNIPOLAR OUTPUT LEVEL (Rear Panel):	+1/-1 V
FUNCTION SWITCH A (Rear Panel)	: All "0"

[Step 1]

Perform the same check as described in paragraph 3.5.3 (2) (a) [Step 1] and [Step 2].

[Step 2]

Check the waveforms and phases at ❼ and ❿ using an oscilloscope.

The waveforms and phases shown in Fig. 3-30 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ❶ to ❿, and Q101.

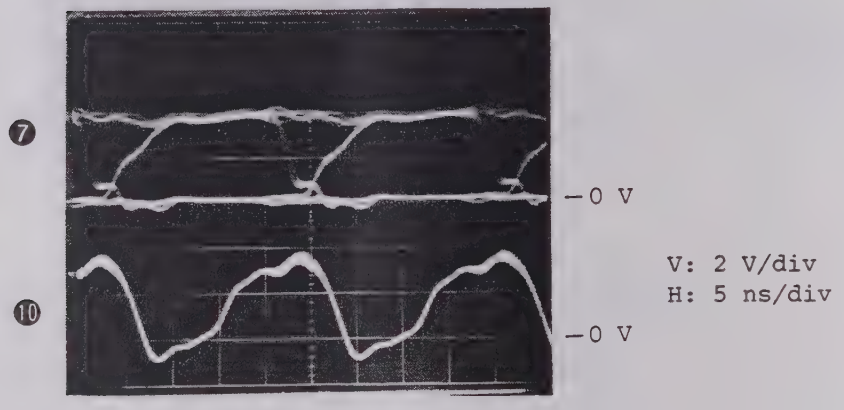


Fig. 3-30 Waveforms at ❼ and ❿

[Step 3]

Check the waveforms at ⓫, ⓬, and ⓭ using an oscilloscope probe.

The waveforms shown in Fig. 3-31 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to Q102, and Q103.

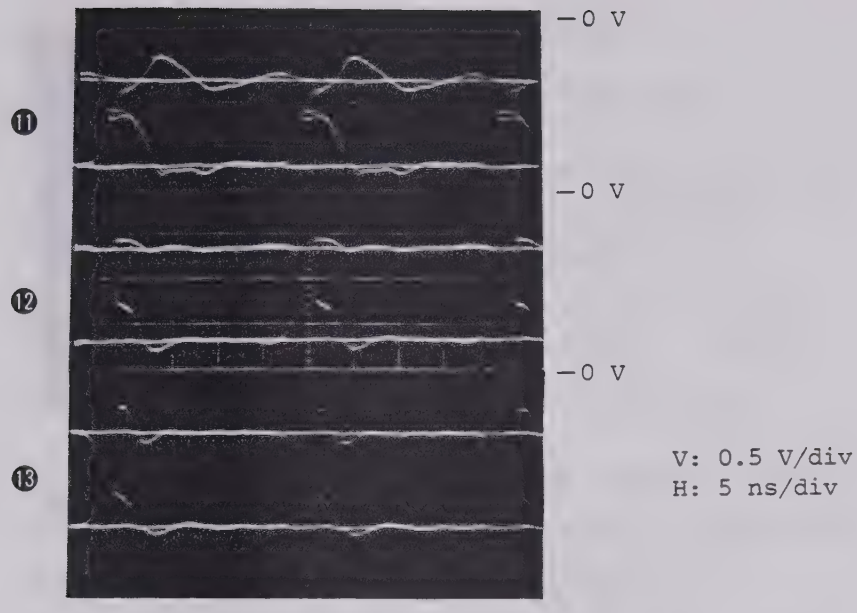


Fig. 3-31 Waveforms at ⓫, ⓬, and ⓭

[Step 4]

Check the waveform at ㉑ using an oscilloscope probe.

The waveform shown in Fig. 3-32 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❶ to ㉑.

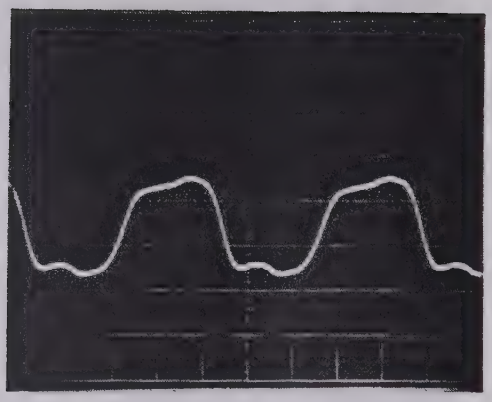


Fig. 3-32 Waveform at ㉑

[Step 5]

Check the unipolar data output and unipolar clock output waveforms.

Connect as shown in Fig. 3-33.

The waveforms and phases shown in Fig. 3-34 are normal.

If they are normal, the unipolar data output and unipolar clock output (±1 V) are normal.

If they are abnormal, make the following adjustment.

Adjustment

1. Adjust the level, offset, and duty.

Table 3-7 Unipolar Output Adjustement

UNIPOLAR OUTPUT	LEVEL		OFFSET		DUTY		
	TTL	+1/-1 V	TTL	+1/-1 V	TTL	+1/-1 V	ECL
DATA (J5)	R295	R296	R301	R302		R365	
CLOCK (J6)	R298	R299	R304	R305		R361	R368

If the waveforms and phases are abnormal after the above adjustment has been made, troubleshoot the circuits related to J5 and J6.

2. If the phase difference T shown in Fig. 3-34 is not within 3.3 ns, adjust W1.

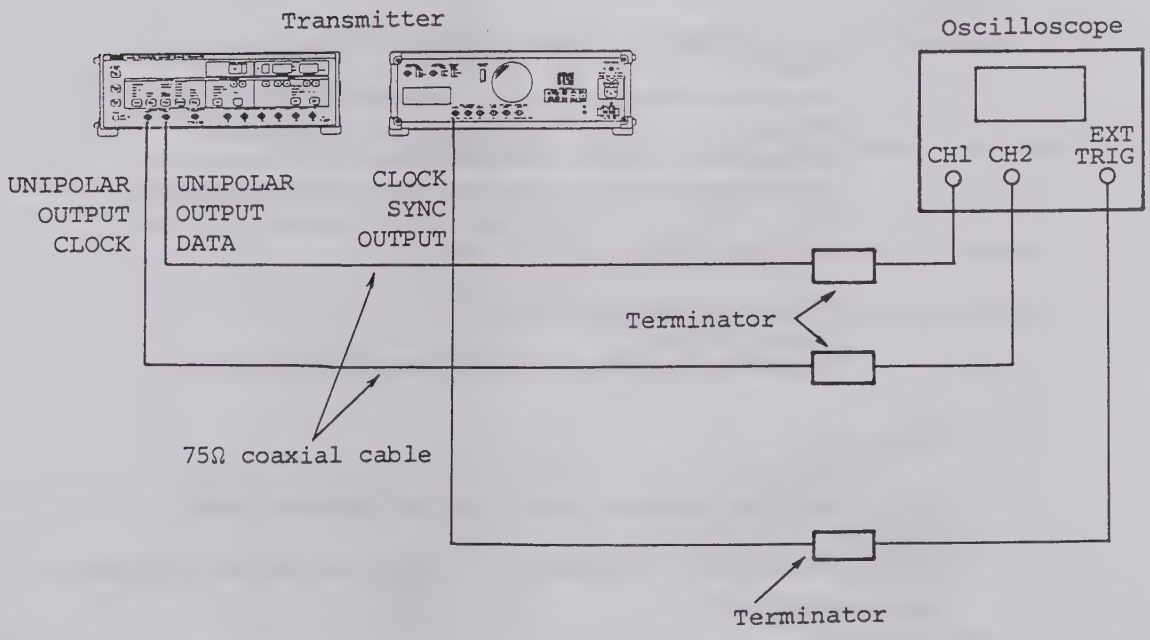


Fig. 3-33 Setup

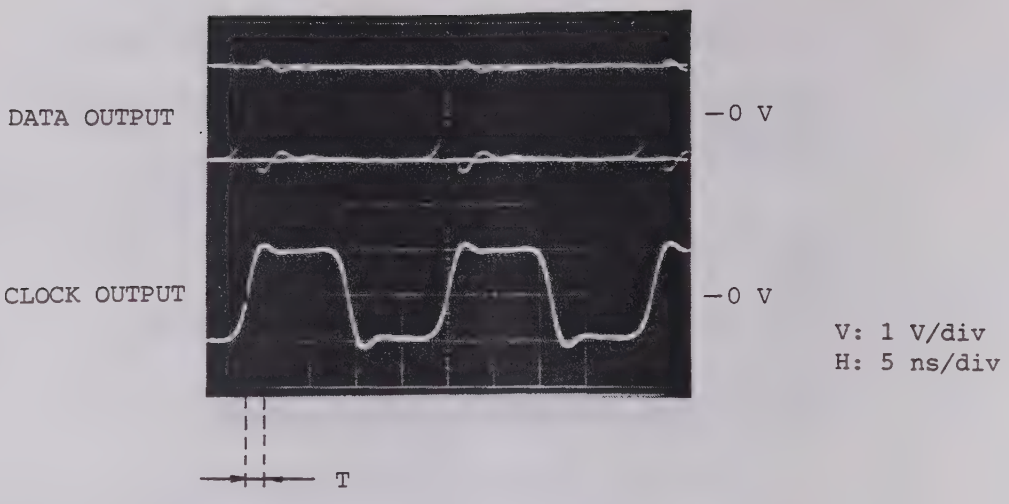


Fig. 3-34 Unipolar Output (+1/-1 V)

(f) Checking ERROR ADDITION

Panel setting

CLOCK	: DS-3
FRAME	: FRAMED OR UNFRAMED
ERROR ADDITION	: ERROR RATE OR EXTERNAL
JUTTER MODULATION	: OFF
FUNCTION SWITCH A (Rear Panel)	: All "0"

[Step 1]

Set the ERROR ADDITION to ERROR RATE.

Check the frequency at ❾ using a frequency counter.

The value shown in Table 3-8 is normal.
If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to Q105 to ❾ and Q101.

Table 3-8 Frequency at ❾

ERROR RATE	Frame OFF	Frame ON
10^{-2}	447.360 kHz	451.879 kHz
10^{-3}	44.736 kHz	44.780 kHz
10^{-4}	4.473 kHz	4.474 kHz
10^{-5}	447 Hz	447 Hz
10^{-6}	44 Hz	44 Hz
10^{-7}	4 Hz	4 Hz
10^{-8}	0.4 Hz	0.4 Hz

[Step 2]

Set the ERROR ADDITION to EXTERNAL.

Connect as shown in Fig. 3-35.

Check the frequency at ❾ using a frequency counter.

If the frequency matches the frequency of the pulse generator, it is normal.

If it is normal, the EXTERNAL ERROR is normal.

If it is abnormal, troubleshoot the circuits related to J3-6 to ❾ and Q101.

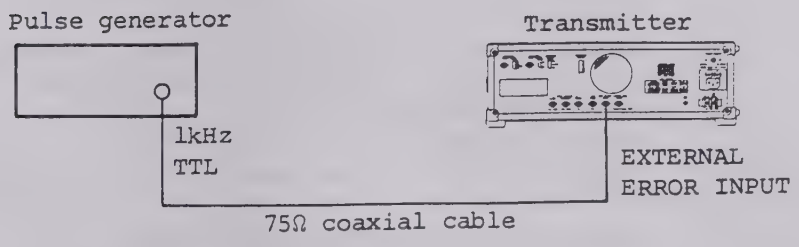


Fig. 3-35 Setup

(g) Checking X-bit input

Check the voltage at ⑳ using an oscilloscope probe.

If the voltage is as shown in Table 3-9, the X-bit input is normal.

Table 3-9 X-bit Input

Panel setting		Level at ⑳
CLOCK	FRAME	
DS-3	FRAMED	H
DS-2	FRAMED	H
DS-1C	FRAMED	H
DS-1	FRAMED D4	L
DS-1	FRAMED ESF	H

H: +2 V to +5 V
L: +0.5 V or less

If it is abnormal, troubleshoot the circuits related to J3-4 to ⑳ and Q101.

(h) Checking external clock

Panel setting

CLOCK	: EXTERNAL
JITTER MODULATION	: OFF
EXTERNAL CLOCK INPUT LEVEL (Rear Panel)	: 0.7 to 1.5 Vp-p
FUNCTION SWITCH A (Rear Panel)	: All "0"

Set-up as shown in Fig. 3-36.

Check the waveform at ❶ using an oscilloscope probe.

The waveform shown in Fig. 3-37 is normal.

If it is normal, EXTERNAL CLOCK is normal.

If it is abnormal, make the following adjustment.

Adjustment

Adjust R46 while checking the waveform at ❶.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to J2-3 to ❶.

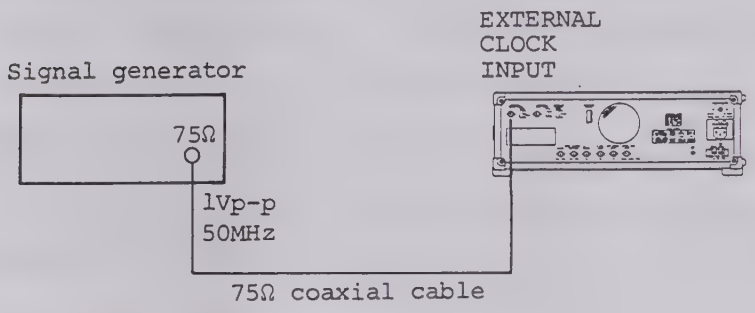


Fig. 3-36 Setup

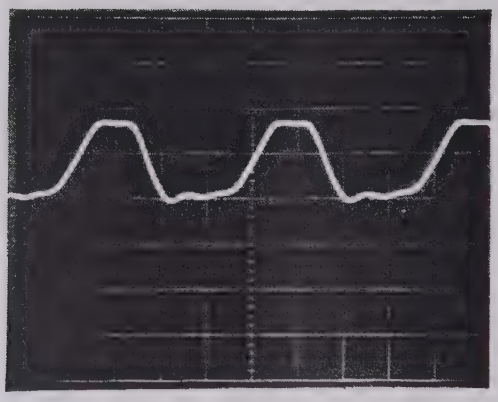


Fig. 3-37 Waveform at ❶ (External clock)

(i) Checking JITTER MODULATION (Only when OPT 01 mounted)

Panel setting

CLOCK	:	DS-3
JITTER MODULATION	:	EXTERNAL
FUNCTION SWITCH A (Rear Panel)	:	All "0"

[Step 1]

Check the waveform at ❷ using an oscilloscope.

The waveform shown in Fig. 3-38 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to X1 to ❷.

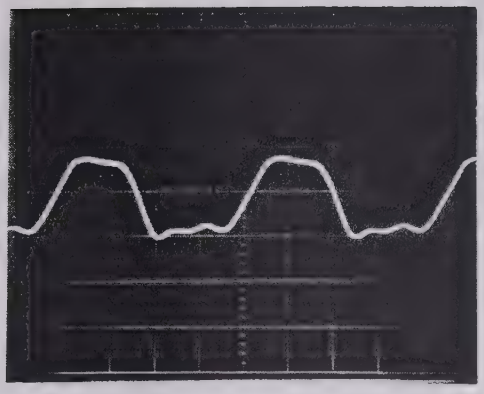


Fig. 3-38 Waveform at ❷

[Step 2]

Check the waveform at ❹ using an oscilloscope.

The waveform shown in Fig. 3-39 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to J14-2 to ❹ .

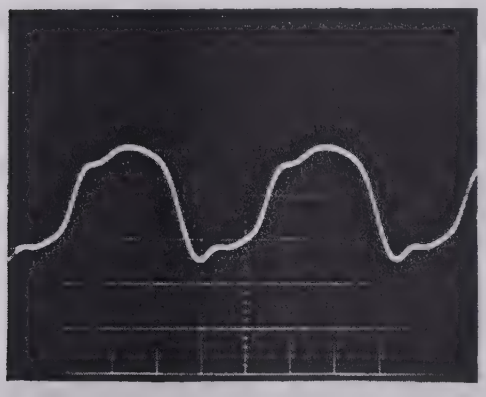


Fig. 3-39 Waveform at ❹

[Step 3]

Check the waveform at ㉒ using an oscilloscope.

The waveform shown in Fig. 3-40 is normal.

If it is normal, JITTER MODULATION is normal.

If it is abnormal, troubleshoot the circuits related to J15-1 to Q106.

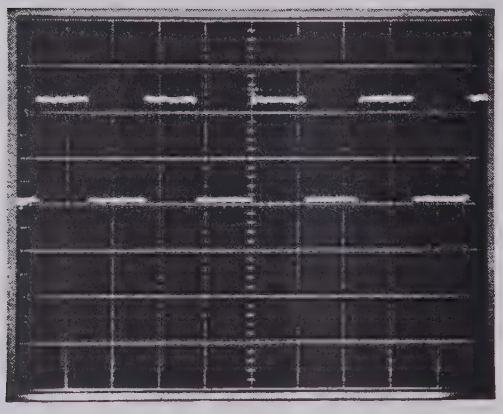


Fig. 3-40 Waveform at ㉒

(j) Checking EXTERNAL DATA (Only when OPT 01 mounted)

Panel setting

CLOCK	:	EXTERNAL
PATTERN	:	EXTERNAL
JITTER MODULATION	:	EXTERNAL
FUNCTION SWITCH A (Rear Panel)	:	All "0"
EXTERNAL CLOCK INPUT LEVEL	:	ECL
EXTERNAL DATA INPUT LEVEL	:	ECL

[Step 1]

Connect as shown in Fig. 3-41.

Check the waveform at ❸ using an oscilloscope.

The waveform shown in Fig. 3-42 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to J2-6 to ❸.

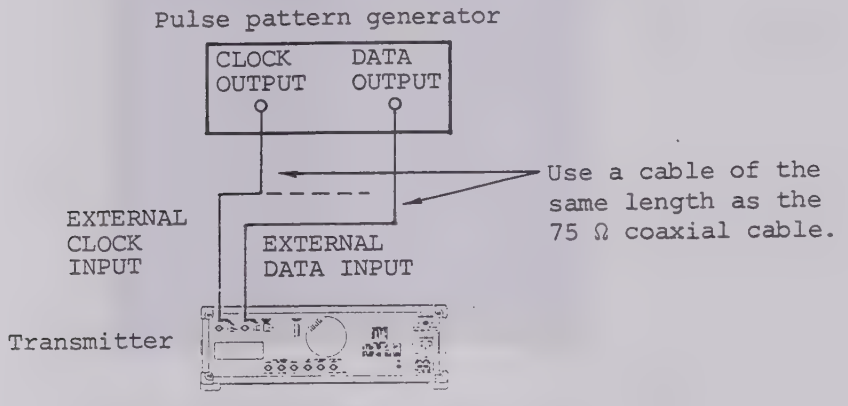


Fig. 3-41 Setup

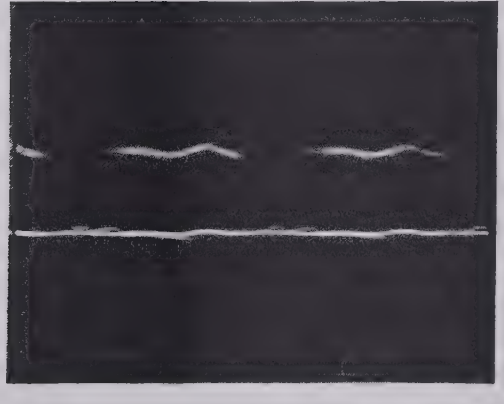


Fig. 3-42 Waveform at ❸

[Step 2]

Check the waveform at ❺ using an oscilloscope.

The waveform shown in Fig. 3-43 is normal.

If it is normal, EXTERNAL DATA is normal.

If it is abnormal, troubleshoot the circuits related to ❸ to ❺.

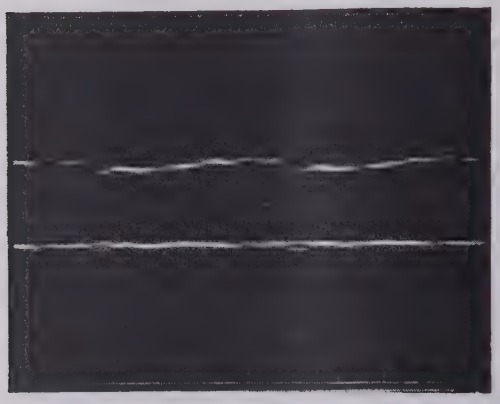


Fig. 3-43 Waveform at ❺

(k) Checking control signals

Panel setting

CLOCK	:	DS-3
FRAME	:	FRAMED
PATTERN	:	PRBS
DS-3 LEVEL	:	DSX-3
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Check the voltage at ㉓ using an oscilloscope probe.

The voltage shown in Table 3-10 is normal.

If it is normal, the control signal is normal.

Table 3-10 Voltage at ㉓

Test point	Voltage at ㉓
Q117-4	H
Q117-3	H
Q117-2	L
Q117-1	L
Q117-40	H
Q117-39	H
Q117-38	L
Q117-18	H
Q117-19	H
Q117-20	H
Q117-21	H
Q117-22	H
Q117-23	L
Q117-24	L
Q117-25	L
Q117-14	L
Q117-15	L
Q117-16	H
Q117-17	L
Q117-13	L
Q117-12	H
Q117-11	L
Q117-10	L

H: +2 V to +5 V
H: +0.5 V or less

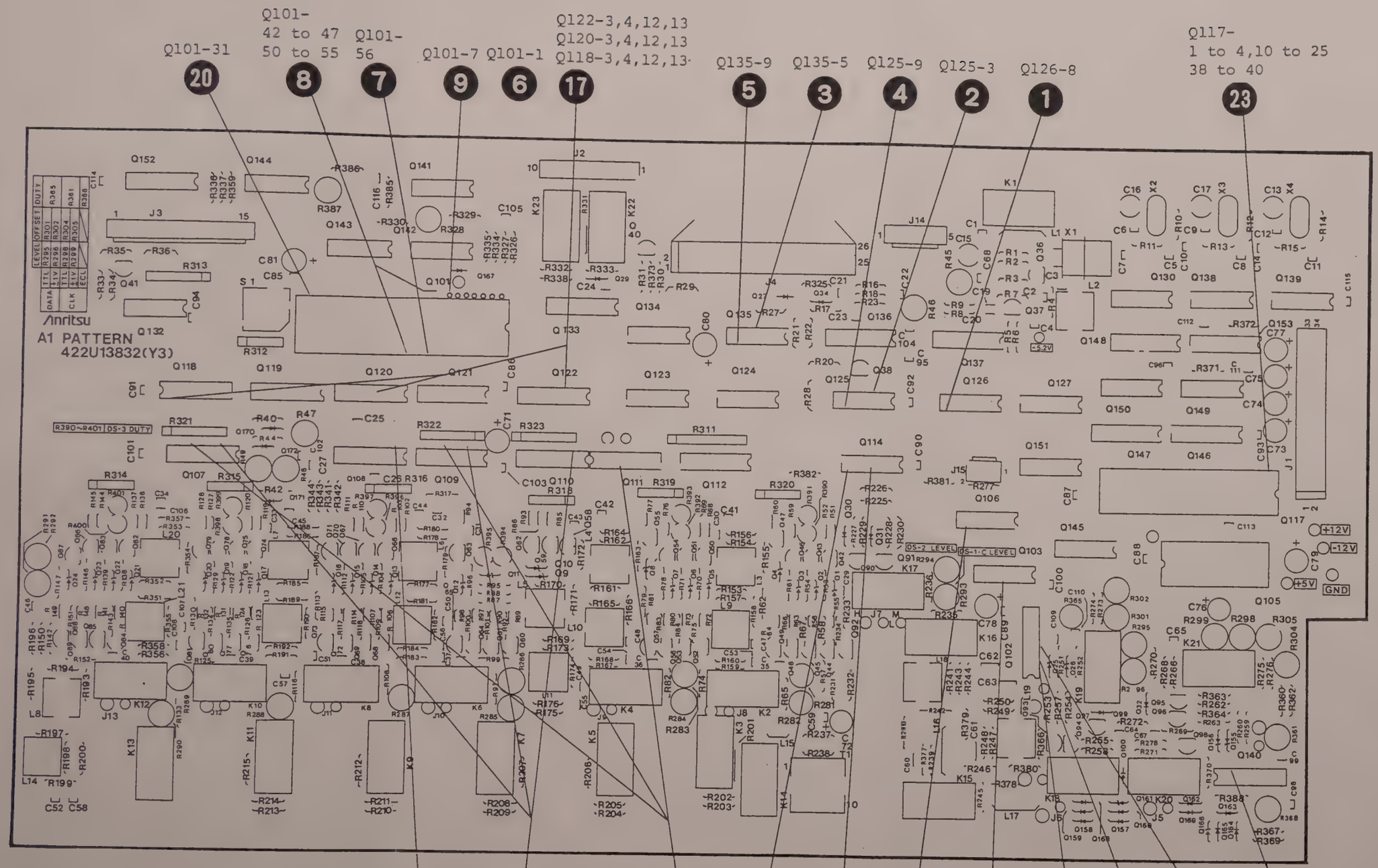


Fig. 3-44 PATTERN GENERATOR
PC Board 3
Parts Layout

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APPLICATION

REVISIONS

C1 5P C15 7P C3 56P R5 47k R1 1k L1 1.5μH L2 0.358μH R4 680 C4 1P Q37 2SC1907 X1 44.736MHz Q36 2SC1907 R8 1k Q137 10125 Q126 74S64 C19 0.1 R2 4.7k R3 10k C2 22P R6 47k R7 1k R9 2.2k C68 0.1 R45 2k C20 0.1 -5.2V -12V X1 X2 12.624MHz 20P C16 R11 2.2k C6 33P Q138 Q138 HD7400 C5 150P R10 4.7k C7 220P DS-2·INT:H Q127-10 +5V Q130 TR1 DS0 X3 12.608MHz 20P C17 R13 2.2k C9 33P Q139 Q139 HD7400 Q130 74LS74 C8 150P R12 4.7k DS-1C·INT:H C10 220P Q127-4 DS-2:L Q146-6 R23 X4 6.176MHz C13 20P R15 2.2k C12 22P Q139 C11 470P R14 4.7k C14 470P DS-1·INT:H Q127-12 R385 10k R386 100 C116 0.1 R387 5k R334 75 R332 300 R331 100 R333 100 Q167 1S953 Q29 1S953 Q133 10125 C24 0.1 Q133-7 Q27-2 DS-3·INT:H3 Q146-9 DS-3·INT:L5 Q127-8 INT:H4 Q127-9 INT:L10 R335 10k Q143 74LS04 Q142 74S00 Q142 Q125 74S00 Q125 Q124 74S04 Q123-12 CLOCK Q123-13 Q134 Q134 EXT DATA Q101-2 Q135 JITTER:L Q127-6 R27 1k JIT DATA J4-26 R28 1k JIT CLOCK J14 J CLOCK JITTER:H Q127-5 Q125 74S00 Q135 74F74 J DATA J4-24 Q142 Q134 Q134 R30 150 Q40 2SC1907 R29 470 R373 33k R31 1k J2 EXT CLOCK EXT DATA J3-14 R22 C21 0.1 R17 470 Q27 1S953 Q34 1S953 R325 300 R16 100 R18 2.2k Q136 10125 C23 0.1 R23 100 Q141 Q141 Q38 2SC1907 C22 0.1 R46 2k R22 820 Q143 R20 270 R21 390 -5.2V C105 0.1 R326 75 R327 470 R329 1k R328 2k Q141 74S00 R22 R330 10k

422U13832

Parts List : 44W88385

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata | TRACED BY | SCALE :

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A1 PATTERN GENERATOR Circuit Diagram (Transmitter)

DRAWING No. 43W36035 1/6

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DEP

No. 0023-1985.08

ANRITSU CORP.

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APPLICATION

REVISIONS

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Q124-12 CLOCK

Q124 Q124 Q124 74S04 Q123 74S04 Q123 Q103 74F74

Q123 Q135-11 Q123 Q148-9

Q111 Q124 Q123 Q111

+5V -5.2V

C71 100 C100 0.1 C101~C104 0.1

-5.2V Q107, Q108, Q109, Q110, Q111, Q118, Q120, Q122, Q133, Q136, Q137, Q102 → 8

G Q111, Q118, Q120, Q122, Q102, Q133, Q136, Q137 → 16

G Q107, Q108, Q109, Q110 → 1, 16

Q101 AB109CSP

C81 100 C85 0.1 C86 0.1

CLOCK
DATA
UNI 1

Q135-9 EXT DATA
Q117-4 DS-3/1C:H
Q117-3 DS-3/2:H
Q117-15 DS-1·B8ZS:H
Q117-16 DS-3·AMI:L
Q117-39 PRBS:H
Q117-38 WORD:H
Q117-20 PATTERN (1)
Q117-21 PATTERN (2)
(FRAME.CODE) A B C D
(PATTERN) E F G H

Q117-1 FRAMED:L
Q117-40 D4:L
Q117-18 FRAMED·10⁻³:L
Q117-25 SINGLE:L

Q121 74F174

CH1+ CH1- CH2+ CH2- CH3+ CH3-

Q119 74F174

CH4+ CH4- CH5+ CH5- CH6+ CH6-

1/N CLOCK → Q105-15
ERROR OUT
PAT SYNL
MF SYNL

Q147-9 ERROR → ERROR IN
C117 100P
T/R
SIG. SIGNAL
NA:H → SIGNALING LOGIC
CODE ERROR
Q143
J1-32 ON:H
Q117-24 EXTER:H → ERROR INT/EXT
X-BIT
Q144 74LS86

Q117-40 D4:L
Q146-4 DS1:L
Q145 74LS32

J3
-5.2V R336 10K R337 10K Q152 TD62003P K22 R325 Q152 K23 +5V

Q132 74LS03 R313 1K
R34 150 R33 470 Q132 Q41 2SC1907 R36 22 R35 1K
EXT ERROR Q143-5
X-BIT

2 TTL:L → K19-16
1 ECL:L → K18-16

Q102 10124
Q102 CLOCK 1 → Q140-13
ECL DATA → K18-8

Delay

Q114 74LS38
Q146-7 DS-3:L
Q114 (+) (-)
R381 1K R382 1K

DATA → Q25
DATA → Q26
Q30
Q31

Q108 10116
Q170 1S953 R47 500 R40 1.2K C25 0.1 R341 180 R342 110 -5.2V
Q171 1S953 R48 500 R42 1.2K C26 0.1 R343 180 R344 110 -5.2V
Q172 1S953 R49 500 R44 1.2K C27 0.1 -5.2V

R323 470 -5.2V
R322 470 -5.2V
R321 470 -5.2V

Q122 10124
Q120 10124
Q118 10124
Q133 10125
Q111 10124

Q110 10101
Q109 10101
Q107 10101

R51 R52 R59 R60 R68 R69 R76 R77
R85 R86 R93 R94
R102 R103 R110 R111
R119 R120 R127 R128 R136 R137 R144 R145

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FIN

CHECKED BY F. Sugita — TRACED BY — SCALE

APPROVED BY E. Sugimoto — DRAWN BY T. Kubota

M-1

TITLE A1 PATTERN GENERATOR Circuit Diagram. (Transmitter)

DRAWING No. 43W36035 2/6

3

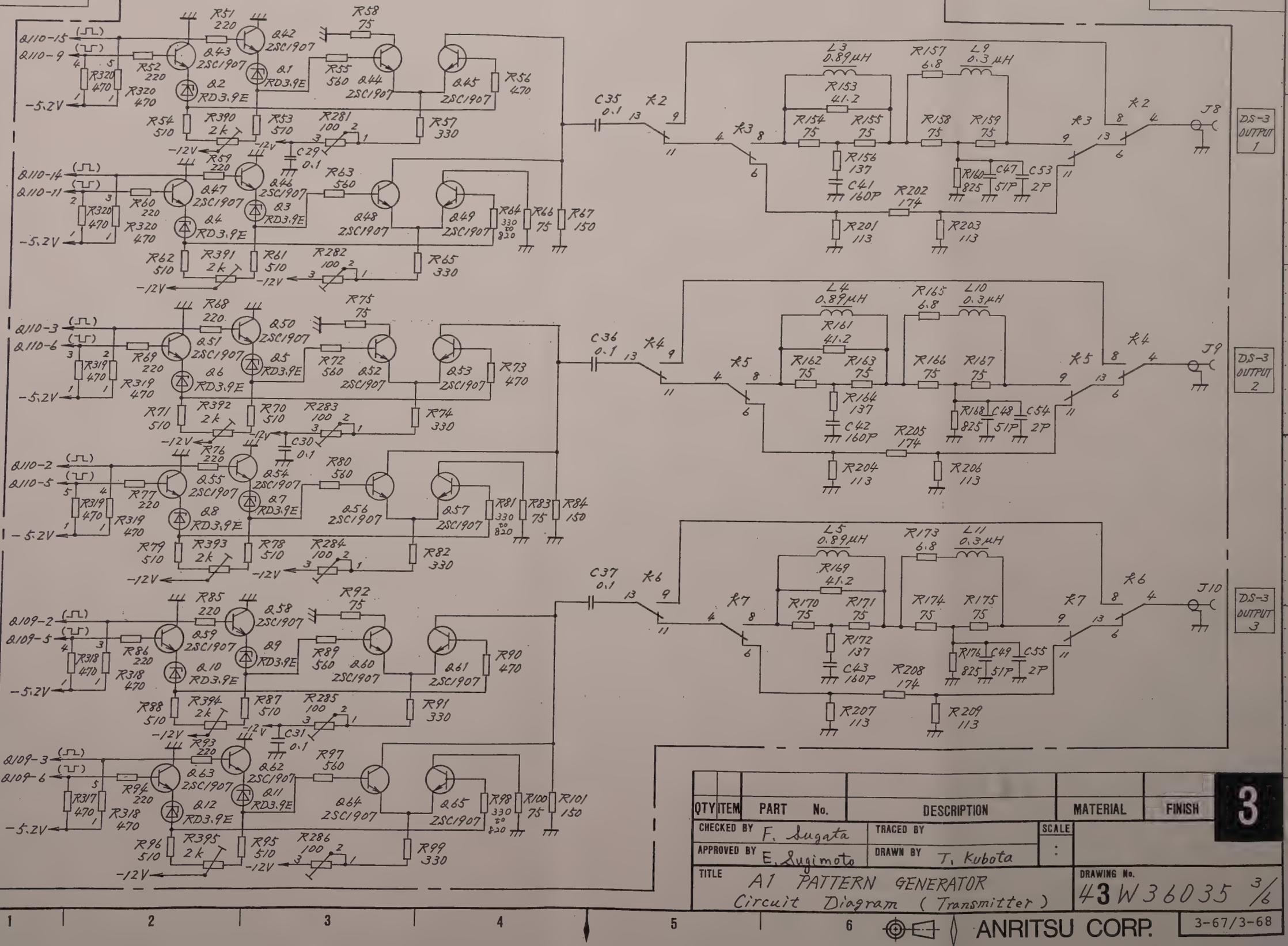
DEP

No. 0021-1985.08

ANRITSU CORP. 3-65/3-66

APPLICATION

REVISIONS



DEP

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata
APPROVED BY E. Sugimoto
TRACED BY
DRAWN BY T. Kubota
SCALE :

TITLE A1 PATTERN GENERATOR
Circuit Diagram (Transmitter)

DRAWING No. 43W36035 3/6

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ANRITSU CORP.

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APPLICATION

REVISIONS

Q109-14 Q109-11 Q109-15 Q109-9 Q107-2 Q107-5 Q107-14 Q107-11 Q107-3 Q107-6 Q107-15 Q107-9

Q66 Q67 Q68 Q69 Q70 Q71 Q72 Q73 Q74 Q75 Q76 Q77 Q78 Q79 Q80 Q81 Q82 Q83 Q84 Q85 Q86 Q87 Q88 Q89
2SC1907

Q13 Q14 Q15 Q16 Q17 Q18 Q19 Q20 Q21 Q22 Q23 Q24
RD3.9E

R102 R103 R104 R105 R106 R107 R108 R109
R110 R111 R112 R113 R114 R115 R116 R117 R118
R119 R120 R121 R122 R123 R124 R125 R126
R127 R128 R129 R130 R131 R132 R133 R134 R135
R136 R137 R138 R139 R140 R141 R142 R143
R144 R145 R146 R147 R148 R149 R150 R151 R152
220 510 560 470 330 75 150

R316 R315 R314 470

R396 R397 R398 R399 R400 R401 2k

R287 R288 R289 R290 R291 R292 100

R180 R184 R188 R192 R196 R200 137

R211 R214 174

R210 R212 R213 R215 113

R177 R185 R193 41.2

R181 R189 R197 R351 6.8

R178 R179 R182 R183 R186 R187 R190 R191 R194 R195 R198 R199 R353 R354 R355 R356 75

R352 R357 137

L6 L7 L8 0.89μH

L12 L13 L14 L20 L21 0.3μH

C32 C33 C34 0.1

C38 C39 C40 0.1

C44 C45 C46 160P

C50 C51 C52 C56 C57 C58 2P

C106 C107 C108 2P

R358 825 51P

R8 R9 R10 R11 R12 R13

J11 J12 J13

DS-3 OUTPUT 4

DS-3 OUTPUT 5

DS-3 OUTPUT 6

-5.2V -12V

DEP

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata — TRACED BY — SCALE :

APPROVED BY E. Sugimoto — DRAWN BY T. Kubota

TITLE A1 PATTERN GENERATOR
Circuit Diagram (Transmitter)

DRAWING No. 43W36035 4/6

3

ANRITSU CORP.

3-69/3-70

No. D023-1985.08

APPLICATION

REVISIONS

Q127-2 DS-3.1NT:H
Q117-23 HIGH:H
Q117-22 DSX-3:H
Q117-12 DSX-2:L
Q146-6 DS-2:L4
Q146-4 DS-1:L
J3-2 TTL:L
J3-1 ECL:L
Q111-13
Q102-1 ECL DATA 8
Q102-4 DATA
Q102-2 DATA
CLOCK2

Q112 TD62003P
Q106 74LS04
Q152 TD62003P
Q140 10116
Q90 2SC2901
Q92 2SC2901
Q91 2SC2901
Q93 2SC2570
Q94 2SC2570
Q95 2SC2570
Q96 2SC2570
Q97 2SA1206
Q98 2SA1206
Q30 1S953
Q31 1S953
Q99 1S953
Q100 1S953
Q25 RD2.7E
Q26 RD2.7E
Q155 RD2.7E
Q156 RD2.7E
Q159 1S953
Q158 1S953
Q157 1S953
Q168 1S953
Q161 RD3.6E
Q160 1S953
Q32 1S953
Q164 1S953
Q163 1S953
Q162 1S953
Q169 1S953
Q166 RD3.6E
Q165 1S953

T1

DS-1/DS-1C /DS-2 OUTPUT

UNIPOLAR OUTPUT DATA

C LOCK

DEP

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

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SCALE :
APPROVED BY E. Sugimoto
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TITLE A1 PATTERN GENERATOR Circuit Diagram. (Transmitter)

DRAWING No. 43W36035 5/6

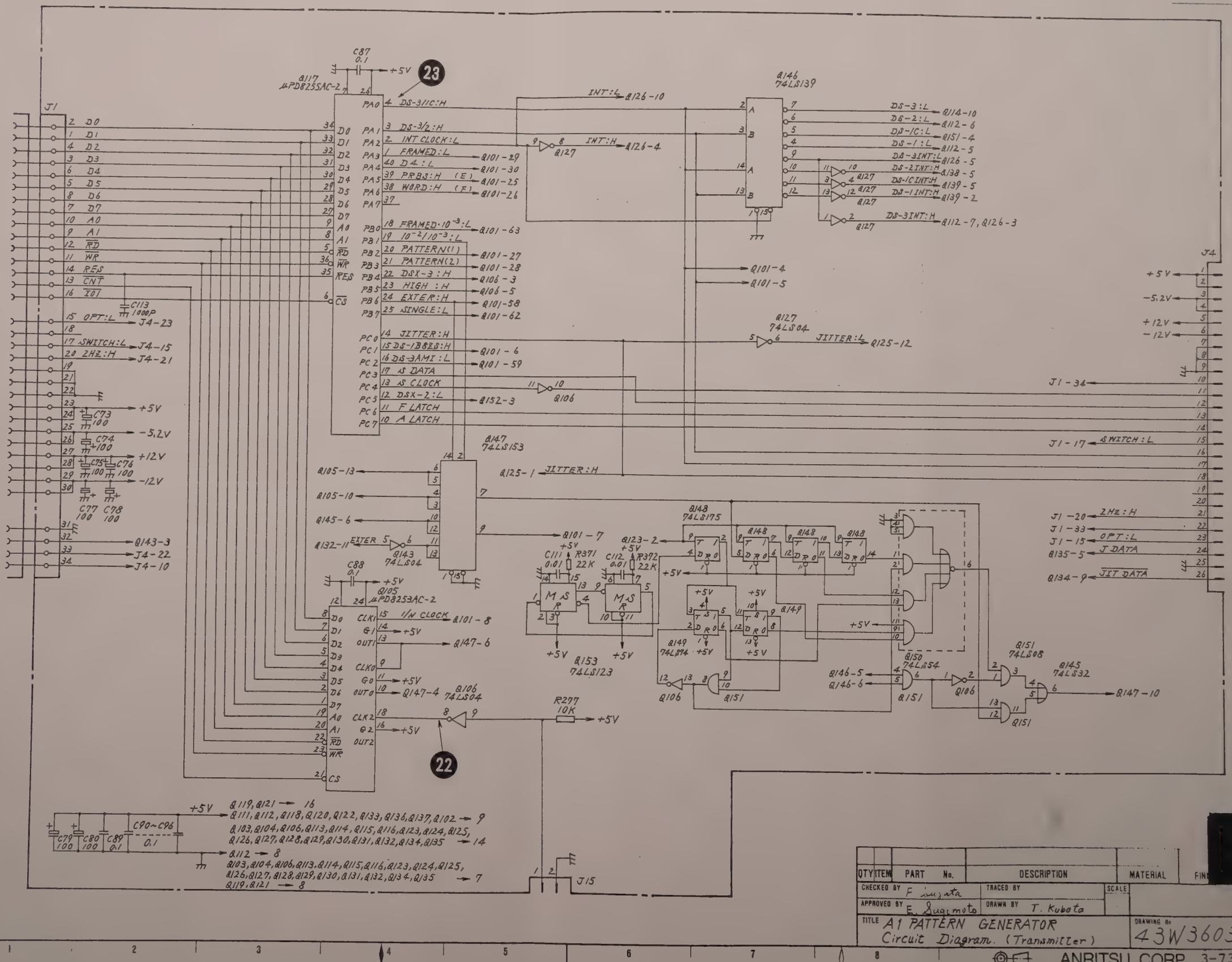
3

ANRITSU CORP.

APPLICATION

REVISIONS

43W36035 6/6



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FIN
CHECKED BY F Sugata		TRACED BY		SCALE	
APPROVED BY E. Sugimoto		DRAWN BY T. Kubota			
TITLE A1 PATTERN GENERATOR Circuit Diagram. (Transmitter)				DRAWING No 43W36035 6/6	

3

DEP

No 0021 1985 08

ANRITSU CORP. 3-73/3-74

3.5.4 A3 T-DISPLAY PC board 4

(1) Circuit Description

Table A3 T-DISPLAY circuit consists of a detection circuit of the front-panel switching status, and a driver circuit for the LEDs and the digital display.

(2) Troubleshoot and adjustment

[Step 1]

Check the waveforms at ❶ using an oscilloscope.

The waveform shown in Fig. 3-45 is normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to Q1.

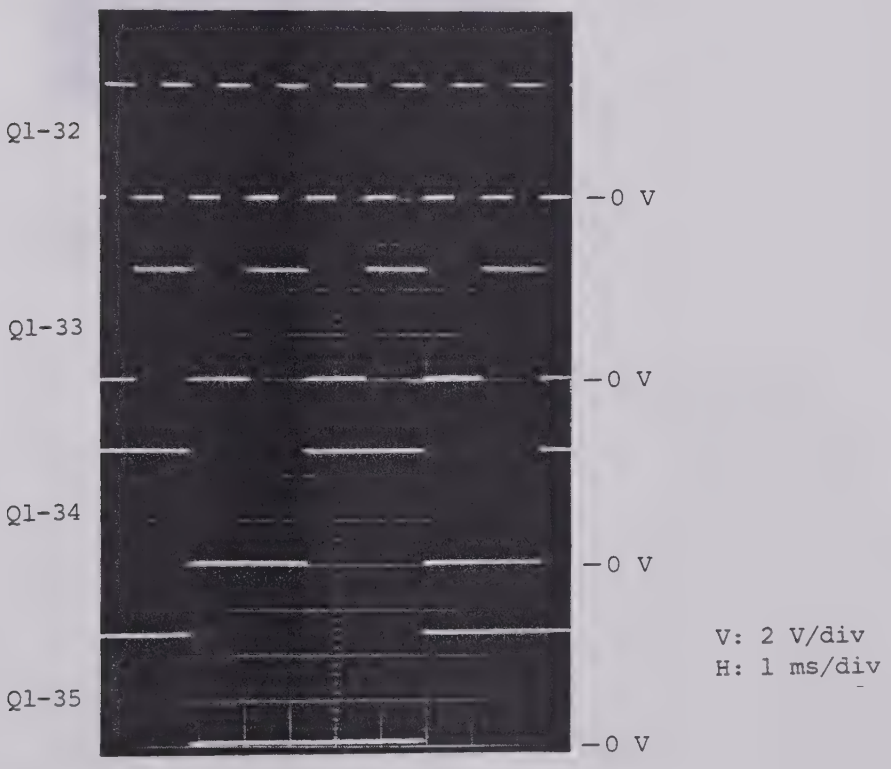


Fig. 3-45 Waveforms at ❶

[Step 2]

Check the waveform at ❷ using an oscilloscope probe when the [CLOCK] key is pressed.

The waveform shown in Fig. 3-46 is normal.

If it is normal, A3 is normal.

If it is abnormal, troubleshoot the circuits related to Q1 and S4.

Fig. 3-46 Waveform at ❷

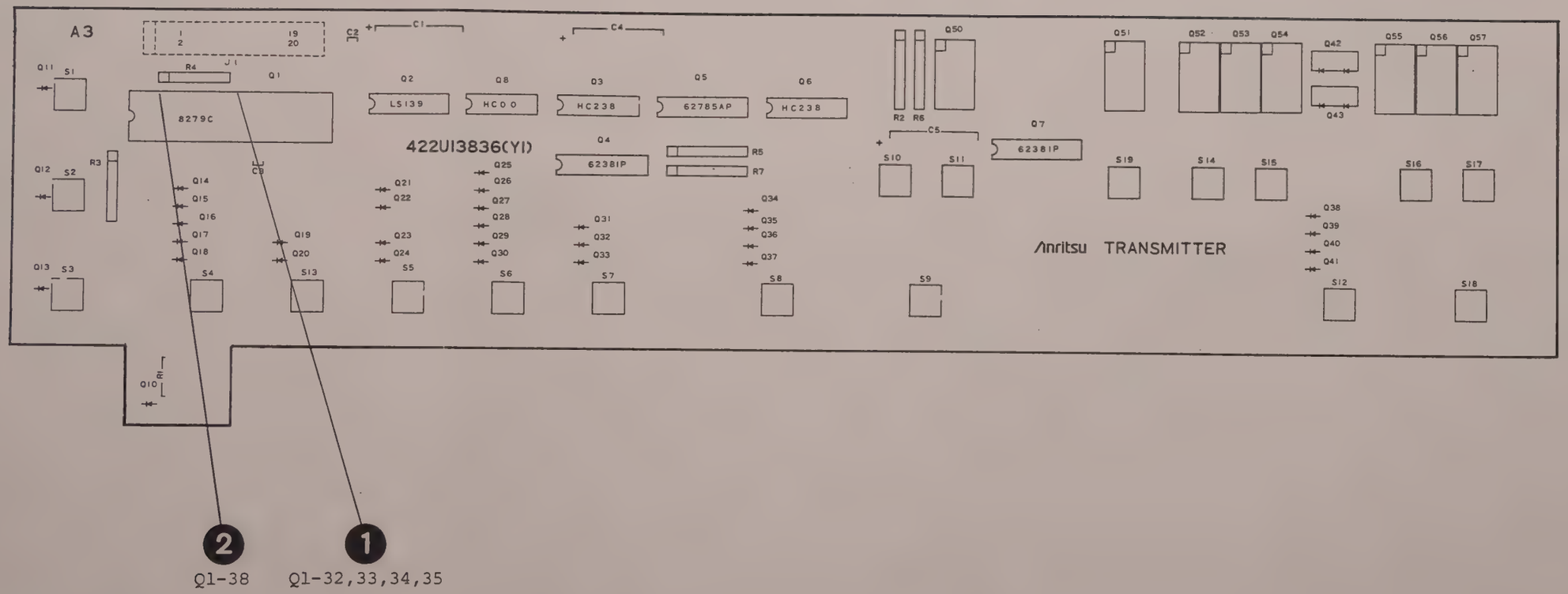


Fig. 3-47 T-DISPLAY PC Board 4
Parts Layout

(3-77 blank)/3-78

43W36037 1/2

APPLICATION

REVISIONS

J1

+5V R3 22k

+5V R4 22k

Q2 74LS139

Q3 74HC238

Q4 TD62381P

Q8 74HC00

Q1 μPD8279C

Q5 TD62785AP

C3 470

R1 620

Q10 LN442YPH

S4 CLOCK	S8 ADD	S12 MOD	S18 MASK SET
S5 FRAME	S9 (SINGLE)		S19
S6 PATTERN	S10	S14	
S7 DS-3 LEVEL	S17	S15	(FREQUENCY)
S2 PANEL LOCK	S1 CONTROL	S16	(AMPLITUDE)
S3 AUTO SET	CODE	S17	

Q41	Q33 OFF	Q24 DSX-3	Q18 FRAMED	DS-3	Hz Q42
Q40	Q32 AUTO	Q23 HIGH	Q16 UNFRAMED	DS-1C	
Q39	Q31 MANUAL	Q30 LOW	Q15 PRBS	DS-1	Q43
Q38	Q37 EXTERNAL	Q29 OFF	Q14 1111	EXTERNAL	
	Q36	Q28 SINGLE	Q11 1100	CONTROL	KHz
Q21	Q35 ESF	Q27 ERROR RATE	Q12 1010	PANEL LOCK	
Q22	Q34 D4	Q25 EXTERNAL	Q13 EXTERNAL	AUTO SET	
Q19	Q20 B8ES	Q26 AMI	Q17 1000	DS-2	

Q11 ~ Q41 TLR209

Q42, Q43 LT-9200N

(AB0) R2-1 (2/2)
(AB1) R2-3 (2/2)
(AB2) R2-5 (2/2)
(AB3) R2-7 (2/2)
(AB4) R6-7 (2/2)
(AB5) R6-1 (2/2)
(AB6) R6-3 (2/2)
(AB7) R6-5 (2/2)

Parts List 44W88387

422U13836

DEP

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

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TITLE A3 T-DISPLAY Circuit Diagram. (Transmitter)

DRAWING No. 43W36037 1/2

4

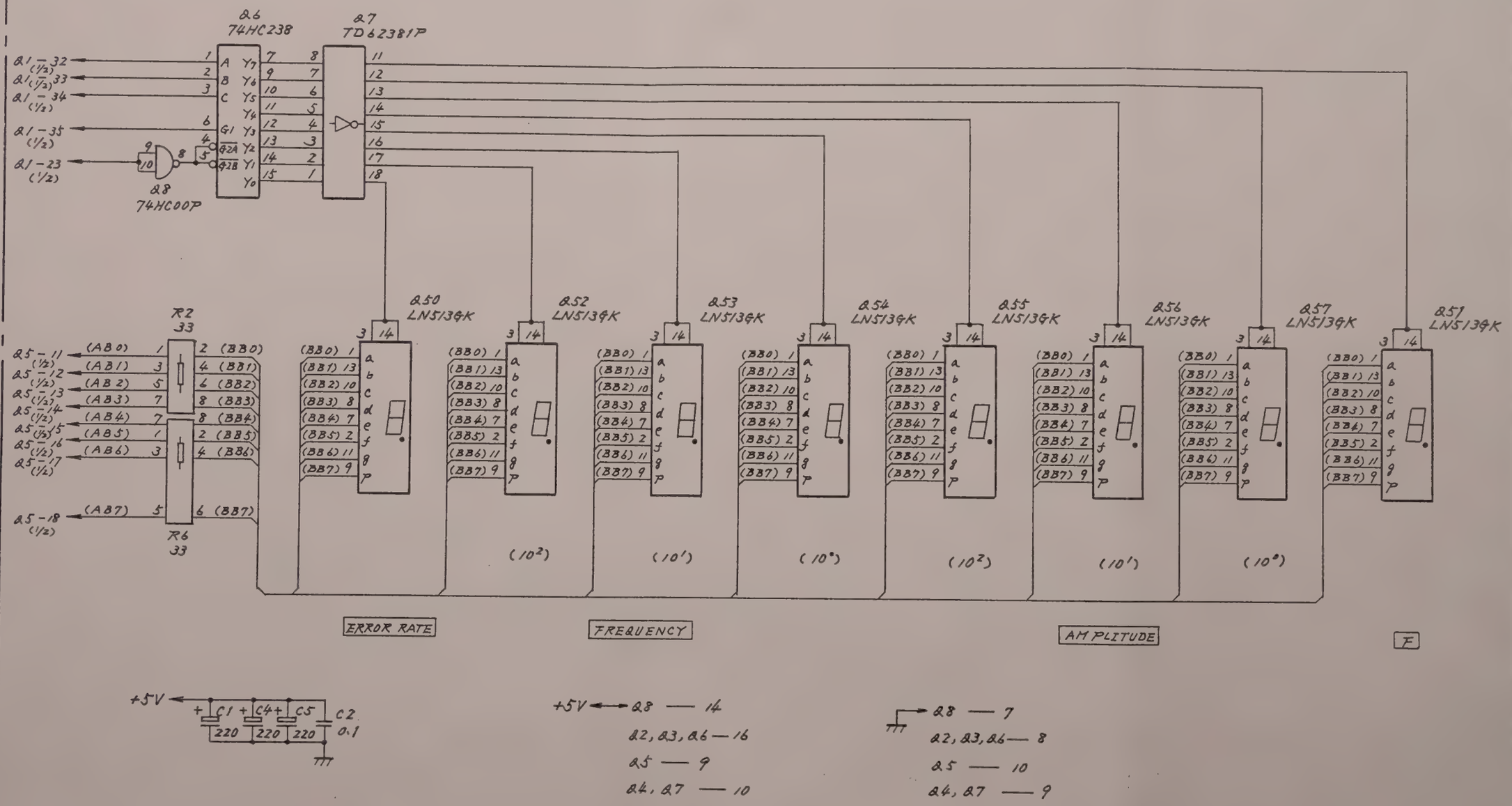
No. 0023-1985.08

ANRITSU CORP.

3-79/3-80

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata	TRACED BY	SCALE	4
APPROVED BY E. Sugimoto	DRAWN BY T. Kubota	:	
TITLE A3 T-DISPLAY Circuit Diagram. (Transmitter)		DRAWING No. 43W36037 2/2	

DEP

ANRITSU CORP.

3-81/3-82

3.5.5 A4 JITTER MODULATION PC board 5 (OPT 01)

(1) Circuit description

Figure 3-49 is the block diagram of this circuit.

The A4 JITTER MODULATION circuit consists of a frequency divider PD (phase-detection) circuit, LPF circuit, VCO circuit, jitter counting circuit, and external data input circuit. The frequency-division circuit divides the clock signal by 10 for DS-3, and by 6 for DS-2/1C/1. The PD circuit detects the phase difference between the reference clock signal and the jitter-modulated clock signal.

The LPF circuit removes the jitter modulation signal.

The VCO circuit generates the jitter-modulated clock signal. The counting circuit detects the jitter and sends a pulse to the A2 T-CONTROL circuit to display the amount of jitter.

The jitter addition circuit adds jitter to the external data signal.

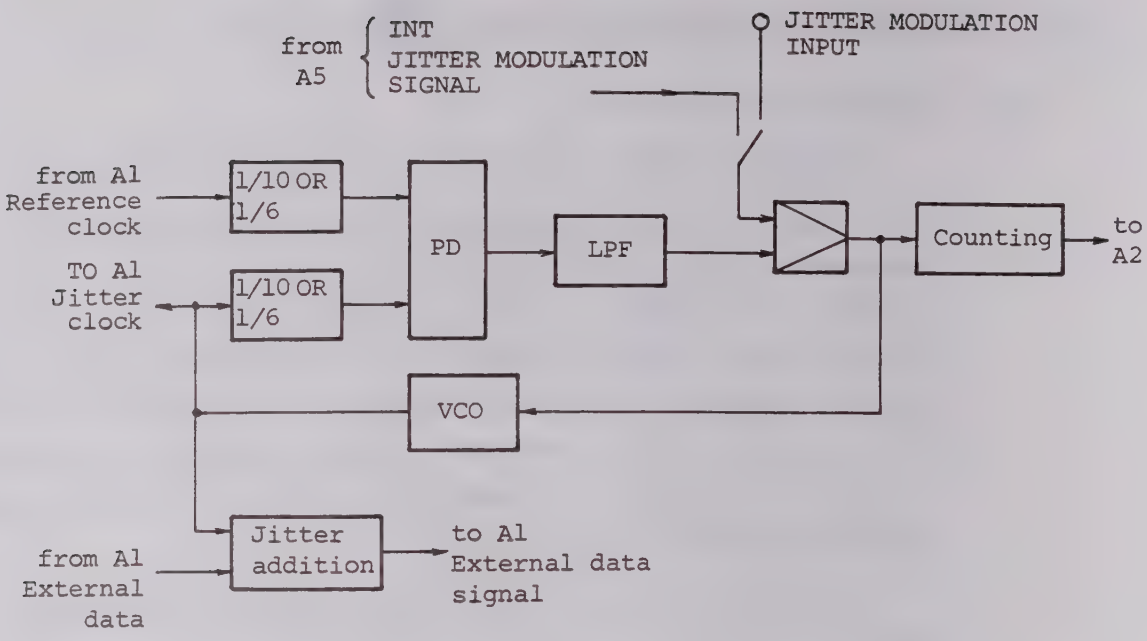


Fig. 3-48 A4 JITTER MODULATION Block Diagram

(2) Troubleshooting and adjustment

Panel setting

CLOCK	:	DS-3
JITTER MODULATION	:	MANUAL
FREQUENCY	:	500 Hz
AMPLITUDE	:	4 UIp-p

[Step 1]

Check the waveforms at ❶ using an oscilloscope probe.

The waveforms shown in Fig. 3-49 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to ❶.

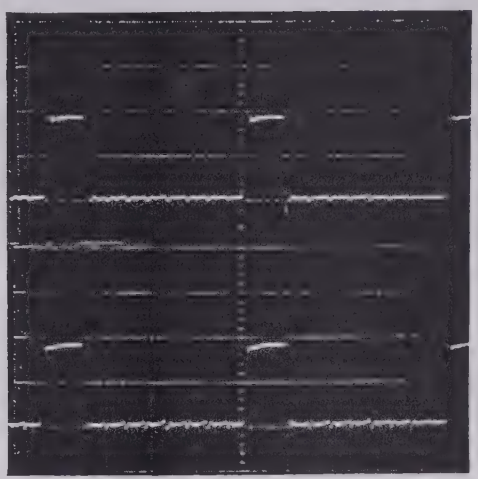


Fig. 3-49 Waveforms at ❶

[Step 2]

Check the waveforms at ❷, ❸ and ❹ using an oscilloscope.

The waveforms shown in Fig. 3-50 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ❶ to ❷, and ❶ to ❸ and ❹.

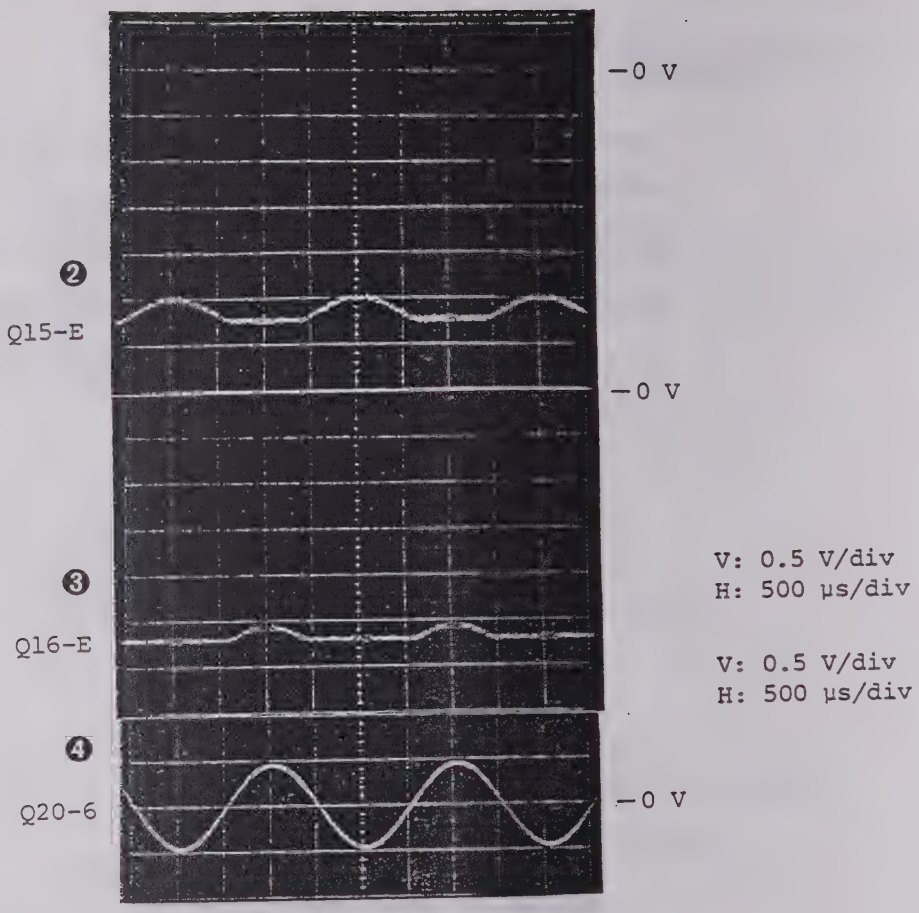


Fig. 3-50 Waveforms at ❷ , ❸ and ❹

[Step 3]

Check the waveform at ❺ using an oscilloscope.

The waveform shown in Fig. 3-51 is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

Adjust R60, R61, R62, or R63 so that the waveform at ❺ is as shown in Fig. 3-51.

CLOCK	DUTY
DS-3	R60
DS-2	R61
DS-1C	R62
DS-1	R63

If it is abnormal after the above adjustment has been made, troubleshoot the circuits related ❹ and ❺.

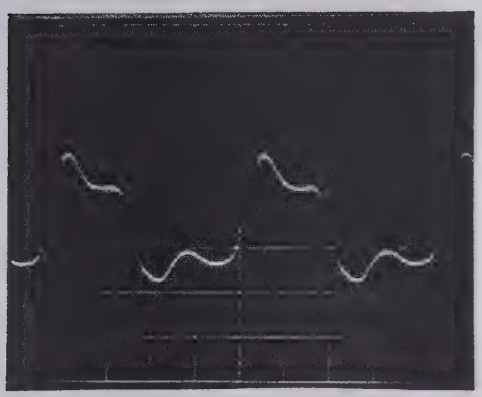


Fig. 3-51 Waveform at ❺

[Step 4]

Check the waveform at ❻ using an oscilloscope. The waveform shown in Fig. 3-52 is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

Adjust the level at R78.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to J8-1 to ❻.

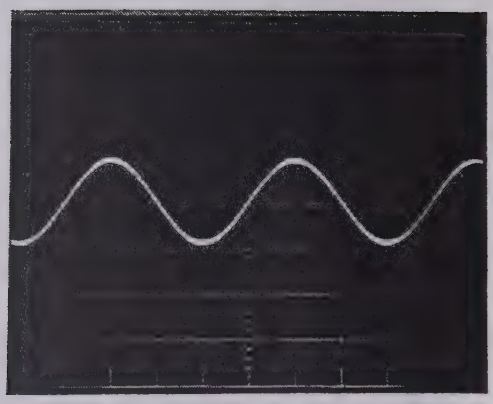


Fig. 3-52 Waveform at ❻

[Step 5]

Check the waveform at ❼ using an oscilloscope probe. The waveform shown in Fig. 3-53 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ❼.

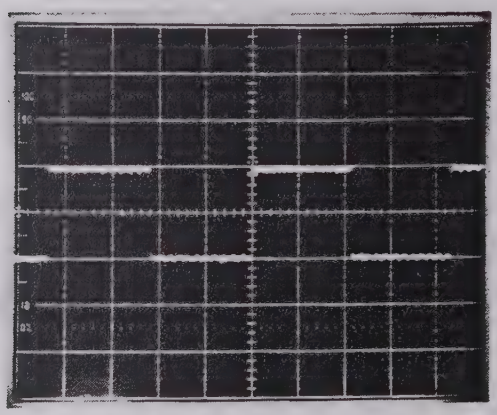


Fig. 3-53 Waveform at ❼

[Step 6]

Check the waveform at ❽ using an oscilloscope.

The waveform shown in Fig. 3-54 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to Q32 to ❽.

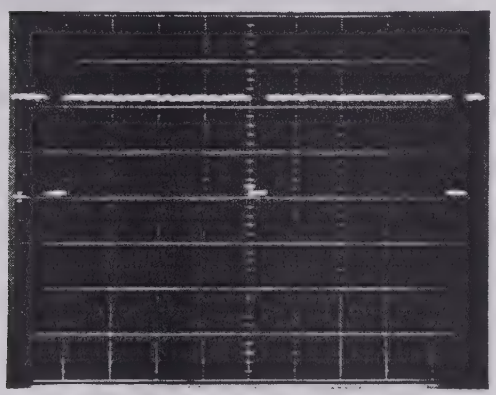


Fig. 3-54 Waveform at ❽

[Step 7]

Set-up as shown in Fig. 3-41. Set the panel as described in paragraph 3.5.3. (2) (i).

Check the waveform at ❾ using an oscilloscope probe.

The waveform shown in Fig. 3-55 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to J1-24 to ❾.

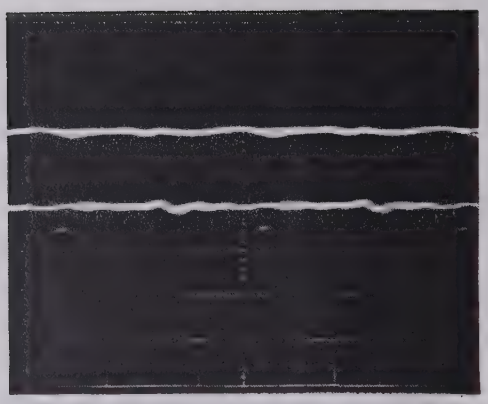


Fig. 3-55 Waveform at ❾

[Step 8]

Check the waveform at ❿ using an oscilloscope.

The waveform shown in Fig. 3-56 is normal.
If it is normal, A4 is normal.

If it is abnormal, troubleshoot the circuits related to ❾ to ❿.

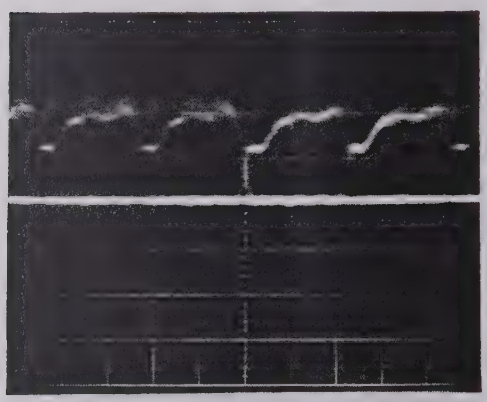


Fig. 3-56 Waveform at ❿

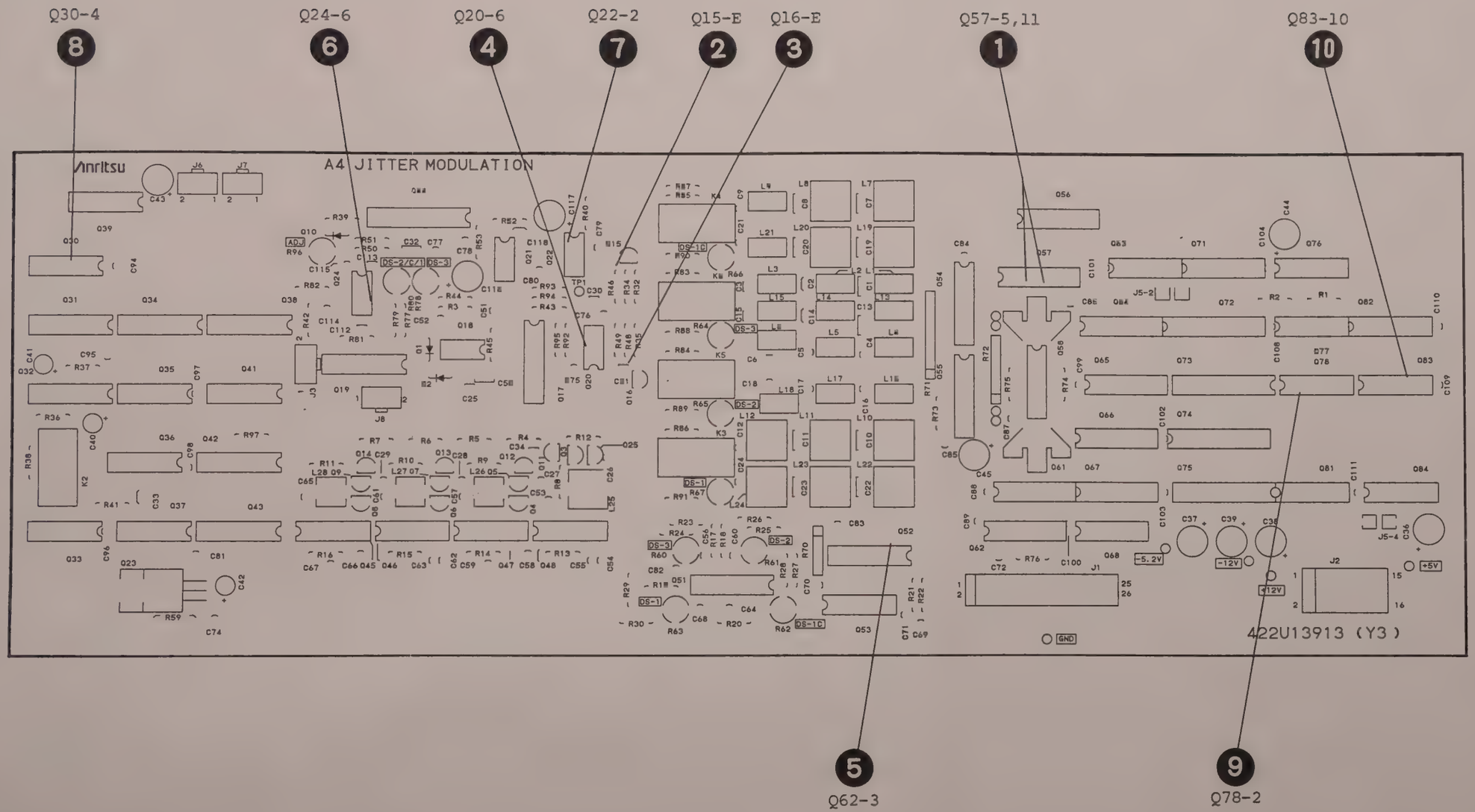


Fig. 3-57 JITTER MODULATION
PC Board 5
Parts Layout

APPLICATION

REVISIONS

43W36038 1/3

Q37-2 DS-3:L(TTL)

Q84-12

Q63-1

Q19-11

Q19-6

Q20-6

Q42-15

J3-2

Q42-2

J8

Q39-8

Q36-8

Q43-4 DS-3:L

Q43-3 DS-2:L

Q43-13 DS-1C:L

Q43-12 DS-1:L

Q39-2

Q39-8

Q39-6

Q39-12

Q22-3

Q56 74F160

Q57 10124

Q58 MC12040P

Q61 10124

Q62 10125

Q67 74F160

Q68 74F00

Q54 10101

Q55 10101

Q17 NJU201AD

Q19 NJU201AD

Q15 2SC1907

Q16 2SC1907

Q20 HA3-2525-5

Q18 HA3-2525-5

Q24 HA3-2525-5

Q11 2SA836

Q12 2SA836

Q13 2SA836

Q14 2SA836

Q3 FC52M

Q4 FC52M

Q5 FC52M

Q6 FC52M

Q7 FC52M

Q8 FC52M

Q9 FC52M

Q48 MC1648P

Q47 MC1648P

Q46 MC1648P

Q45 MC1648P

Q51 MC10115L

Q52 10102

Q53 μPC177C

Q23 μPC1630SH

Q1 1SS53

Q2 RD3.9E

J8

J3

EXT

R42 75

R44 1.00K

R45 1.00K

R43 1.00K

R46 1.00K

R48 1.00K

R32 909

R34 2.2K

R35 2.2K

R49 2.49K

R59 33

R98 200K

R99 200K

R100 200K

R92 2.43K

R95 2.61K

R94 3.16K

R93 2.87K

C30 5P

C31 5P

C42 47

C74 0.1

C75 0.1

C76 0.1

C72 0.1

C34 5P

C113 5P

C115 0.1

C114 0.1

L1 120μH

L2 120μH

L3 56μH

L4 680μH

L5 680μH

L6 330μH

L7 1mH

L8 1mH

L9 560μH

L10 2.2mH

L11 2.2mH

L12 1mH

L13 120μH

L14 120μH

L15 56μH

L16 680μH

L17 680μH

L18 330μH

L19 1mH

L20 1mH

L21 560μH

L22 2.2mH

L23 2.2mH

L24 1mH

L25 0.31μH

L26 15μH

L27 56μH

L28 220μH

R83 6P.8

R84 121

R85 32.4

R86 0~51.1

R87 1K

R88 750

R89 576

R90 750

R91 698

R64 200

R65 500

R66 200

R67 200

R77 866

R78 200

R79 1.43K

R80V 200

R22 3.3K

C112 24P

Parts List: 44W88388

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINI

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APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A4 JITTER MODULATION Circuit Diagram.(Transmitter)(OPT 01)

DRAWING No 43W36038 1/3

ANRITSU CORP. 3-93/3-94

422U13913

5

DEP

No. 8021-1985.08

APPLICATION

REVISIONS

43W36038 2/3

J1 J2

C36 330 +5V
C37 330 -5.2V +12V
C38 330
C39 330 -12V

Q84-10 2.1KHz:H
Serial Clock
Serial Data
FREQ Latch
AMP Latch
+5V -5.2V +12V -12V

R36 22K
R37 33K
R38 18K
K2
C40 2.2
C41 47
Q32 74LS123
Q32

Q35 74LS74
Q30
Q37
Q43 10124
Q36 74LS08
Q36
Q37
Q39
Q41 74LS04
Q42 TD62003P
Q41 74LS74
Q83 74S04
Q84 74LS04

DS-3:L (TTL)
DS-3:L
DS-2:L
DS-1C:L
DS-1:L
Q54-10
Q17-16
Q19-16
Q54-4
Q17-1
Q54-13
Q17-8
Q54-7
Q17-9
Q19-1
Q19-9
Q19-8
Q76-4 (3/3)

K6 K5 K4 K3 K2

15 Latch:L → Q82-4
16 PAT B
17 PAT A
18 OFF:L
19
20
21 2Hz:H
22 EXT:H
23
24 Data input → Q83-1
25
26 Data output → Q83-10

R97 10K

Q31 74LS191
Q34 74LS191
Q38 74LS191
Q41 74LS74

R10 1SZ52
R39 680
R96 500
R50 274K
R51 3.01K
R53 301
R52 301
C118 100P
C79 0.1
C80 0.1
C77 0.1
C32 47P
C78 0.1

D/A
MSB
LSB
Q44 HA17012PC

Q21 μPC151C
Q22 μPC271C
R40 10K
R41 330
C33 100P

Q20-6
+12V -12V

Q30 74LS86
Q33 74LS20
Q37 74LS14

J6
J7

8
7

C43 330
C44 330
C90 0.1
C91~C111 0.1
C45 330
C81
C82~C89

Q42, Q43, Q57, Q61, Q62, — 9
Q30, Q33, Q35, Q36, Q37, Q41, Q63, Q68 — 14
Q76, Q77, Q78, Q81, Q83, Q84, — 14
Q31, Q32, Q34, Q38, Q56, Q64, Q65, Q66, Q67, Q71, Q82 — 16
Q72, Q73, Q74, Q75, — 20
Q42, — 16
Q30, Q33, Q35, Q36, Q37, Q41, Q63, Q68 — 7
Q76, Q77, Q78, Q81, Q83, Q84, — 7
Q31, Q32, Q34, Q38, Q56, Q64, Q65, Q66, Q67, Q71, Q82 — 16
Q72, Q73, Q74, Q75, — 10

Q51, Q52, Q54, Q55 — 8
Q57, Q61, Q62, Q43 — 8
Q51, Q52, Q54, Q55 — 1, 16

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FIN

CHECKED BY F. Sugata — TRACED BY — SCALE :
APPROVED BY E. Sugimoto — DRAWN BY T. Kubota

TITLE A4 JITTER MODULATION
Circuit Diagram. (Transmitter) (OPT 01)

DRAWING No. 43W36038 2/3

5

DEP

No. 0021-1985.08

ANRITSU CORP 3-95/3-96

43W36038 3/3

APPLICATION

REVISIONS

Q82 74F175

Q82 Q84 Q77 Q76 Q63 74S04 Q63 Q63 Q63

J1-15 J2-14 Q67-2 Q84-3 J5

+5V

Q84 74S04 Q84 Q56-2 J5-4 CLK Q84 Q84 Q84

Q83 74S04 J1-24 DATA

Q65 74F161 Q71 74F161 P0 P1 P2 P3 L R T TC Q0 Q1 Q2 Q3

Q64 74F151 S0 S1 S2 E I0 I1 I2 I3 I4 I5 I6 I7 Z

Q78 74F164 A B Q7 Q6 Q5 Q4 Q3 Q2 Q1 Q0

Q73 74F374 Q72 74F374 T E D Q

Q83 OFF:L Q83-8 R1 1k Q77 74F00 Q76 74F74 TS DR DATA J1-26

R2 1k

Q66 74F151

Q81 74F164 Q75 74F374 Q74 74F374

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata	TRACED BY	SCALE :	5
APPROVED BY E. Sugimoto	DRAWN BY T. Kubota	M-1	
TITLE A4 JITTER MODULATION Circuit Diagram. (Transmitter) (OPT 01)		DRAWING No. 43W36038 3/3	

DEP

No. 0023-1985.08

ANRITSU CORP.

3-97/3-98

3.5.6 A5 MODULATION SIGNAL GENERATOR 6

(1) Circuit description

The A5 MODULATION SIGNAL GENERATOR circuit consists of a jitter modulation oscillation circuit and level variable D/A converter and generates the jitter modulation signals (2 Hz to 300 kHz sine wave).

(2) Troubleshooting and adjustment

Panel setting

CLOCK	:	DS-3
JITTER MODULATION	:	MANUAL
FREQUENCY	:	500 Hz
AMPLITUDE	:	4 UIp-p

[Step 1]

Check the waveform at ❶ using an oscilloscope.

The waveform shown in Fig. 3-58 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to Z1 to ❶.

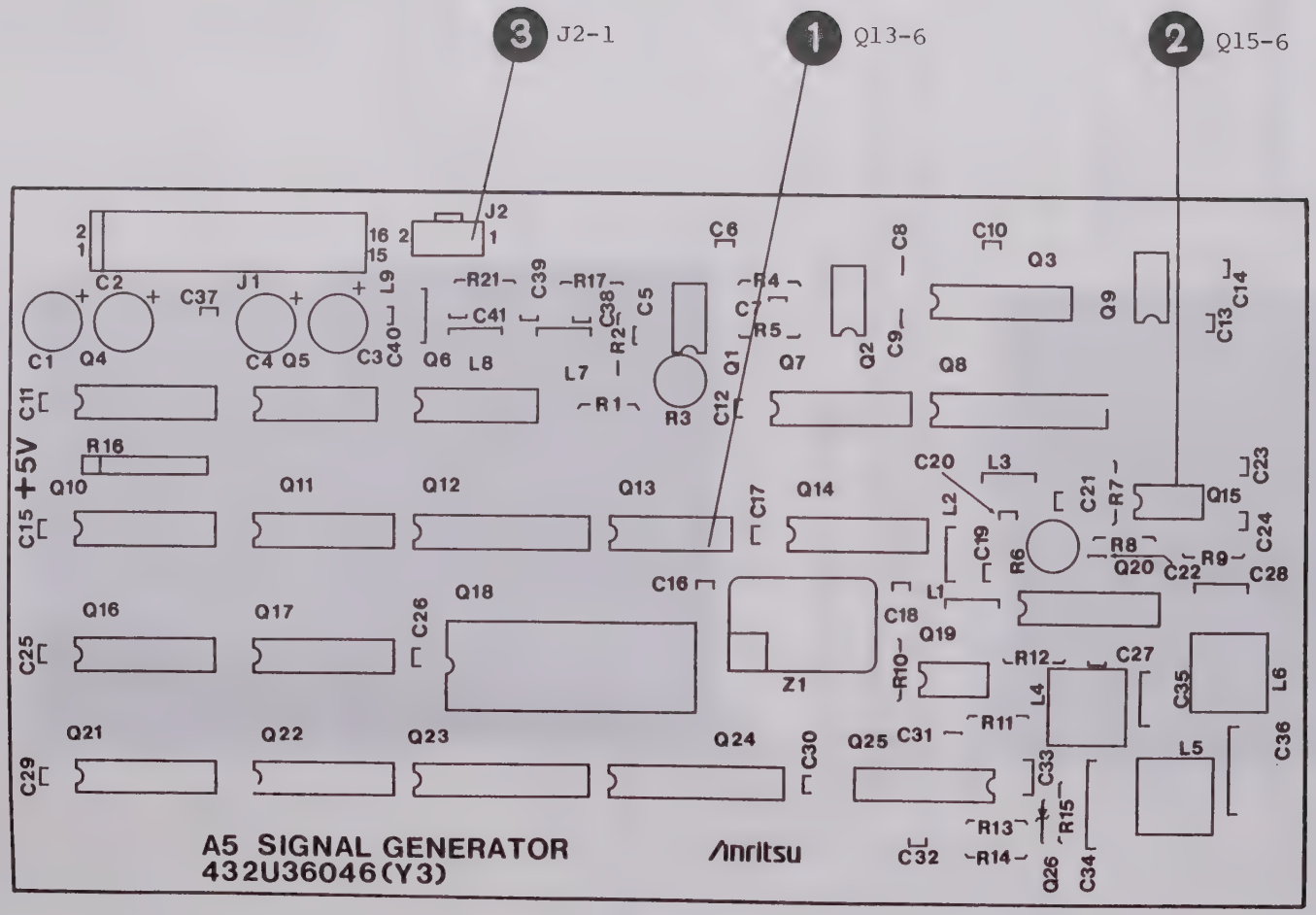


Fig. 3-61 MODULATION SIGNAL GENERATOR
PC Board 6 Parts Layout

APPLICATION

REVISIONS

J1

Q4 74LS365A

C37 0.1

R16 10k

+5V

Q6-13(3/2)
Q13-12(3/2)
Q5-3(3/2)
Q7-14(3/2)
Q7-12(3/2)

C1 330 +5V
C4 330 -5.2V
C2 330 +12V
C3 330 -12V

Q21 TC74HC283P

Q23 TC74HC273P

Q16 TC74HC595P

Q22 TC74HC283P

Q11 TC74HC283P

Q10 TC74HC595P

Q12 TC74HC273P

Q17 TC74HC283P

Z1 3.2768MHz

C16 0.1 +5V

Q13 74LS00

Q14 74LS390

Q24 74LS273

Q18 EPROM32kX8 -20C

R13 3.01k
R14 3.01k
R15 680 +12V

Q26 1SE52

R10 511

Q19 NJM5534D

R12(3/2)

R11 511 -12V

Q25 μPC624C

C32 0.1 +12V
C33 100P -12V
C31 0.1

C11 C12 C13 C15 C17 C25 C29 C30 0.1 +5V

C26 0.1 +5V

1

Parts List | 44W88408

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata | TRACED BY | SCALE :

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A5 MODULATION SIGNAL GENERATOR Circuit Diagram. (Transmitter)(OPT 01)

DRAWING No. 43W36048 1/2

DEP

432U36046

6

APPLICATION

REVISIONS

+5V ⟷ Q5, Q6, Q13 —— 14
Q4, Q7, Q10, Q11, Q14, Q16, Q17, Q21, Q22 —— 16
Q8, Q12, Q23, Q24 —— 20

Q5, Q6, Q13 —— 7
Q4, Q7, Q10, Q11, Q14, Q16, Q17, Q21, Q22 —— 8
Q8, Q12, Q23, Q24 —— 10

Q5 TC74HC74
Q6 TC74HC74P
Q7 74HC595
Q8 TC74HC273P
Q9 LT1016CN8
Q13 74LS00
Q15 NJM5534D
Q20 NJU201A
Q3 AD7533LN
Q2 NJM5534D
Q1 NJM5534D

Q4-9 (1/2)
Q4-5 (1/2)
Q4-11 (1/2)
Q4-7 (1/2)
Q19-6 (1/2)
Q4-13 (1/2)

R12 604
R7 604
R9 604
R1 10k
R2 4.75k
R3 2k
R4 1k
R5 1k
R6 100
R20 15.0k

L4 12mH
L5 18mH
L6 12mH
L1 220μH
L3 390μH
L3 220μH

C35 0.012
C34 0.047
C36 0.047
C28 0.012
C19 220P
C18 0.001
C20 0.001
C21 220P
C22 0.1
C27 0.1
C23 0.1
C24 0.1
C21 0.1
C10 0.1
C9 10P
C7 0.1
C8 0.1
C5 0.1
C6 0.1

+5V
+12V
-12V
+5V -5.2V

2
3

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata
APPROVED BY E. Sugimoto
TRACED BY
DRAWN BY T. Kubota
SCALE :
M-2

TITLE A5 MODULATION SIGNAL GENERATOR
Circuit Diagram. (Transmitter) (OPT 01)

DRAWING No. 43W36048 2/2

DEP

ANRITSU CORP.

3.5.7 A6 T-SWITCH PC Board 7.

A7 GP-IB PC Board 8 and

A8 RS-232C PC Board 9

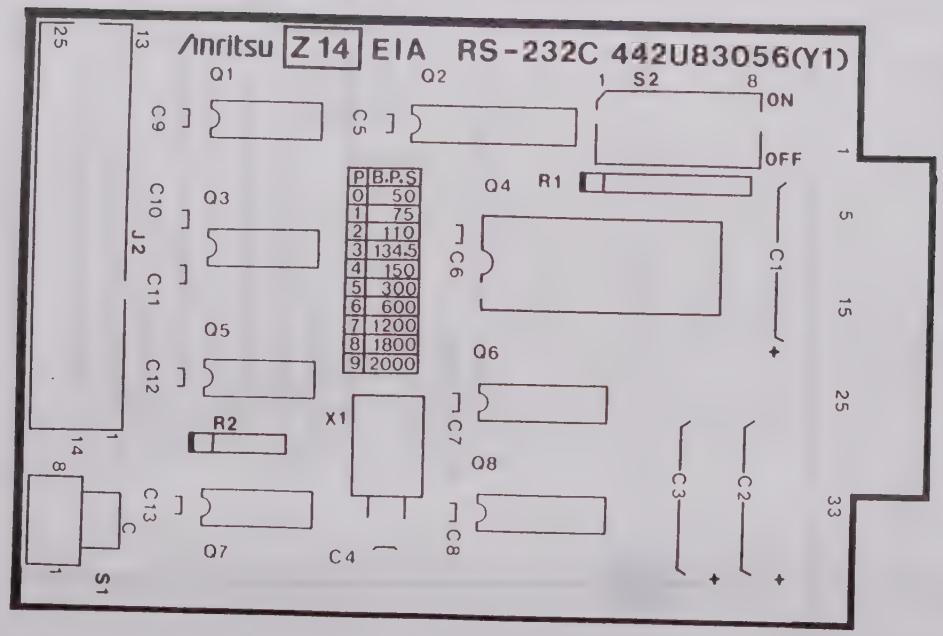


Fig. 3-63 GP-IB PC Board 8 Parts Layout

APPLICATION

REVISIONS

J1
1 (SEL0)
2 (SEL1)
3 (DB0)
4 (DB1)
5 (DB2)
6 (DB3)
7 (DB4)
8 (DB5)
9 (DB6)
10 (DB7)
11 (AB0) → Q3-21
12 (AB1) → Q3-22
13 (AB2) → Q3-23
14 (AB3)
15 ($\overline{GPRS}$)
16
17 (Φ12) → Q5-14
18
19 ($\overline{IORD}$) → Q5-10
20 ($\overline{IOWR}$) → Q5-6
21 (RES) → Q5-4
22 (GPIB) → Q5-4
23
24
25
26
27
28
29
30
31
32
33
34

R1 10K
+5V

Q6 74LS240

S1

PIN NO	
8	A1
7	A2
6	A3
5	A4
4	A5
3	LON
2	TON
1	ST

Address

Q9 74LS139

Q8 74LS32

Q9

Q3 μPD7210C

(DB7) 19 D7 DIO8 35
(DB6) 18 D6 DIO7 34
(DB5) 17 D5 DIO6 33
(DB4) 16 D4 DIO5 32
(DB3) 15 D3 DIO4 31
(DB2) 14 D2 DIO3 30
(DBI) 13 D1 DIO2 29
(DB0) 12 D0 DIO1 28

J1-13 ← (AB2) 23 RS2
J1-12 ← (AB1) 22 RS1
J1-11 ← (AB0) 21 RS0

9 $\overline{RD}$
10 $\overline{WR}$
8 $\overline{CS}$
3 CLOCK
4 RESET
11 INT

Q1 75160A

17 D8	B8 9		(DI08)
13 D7	B7 8		(DI07)
14 D6	B6 7		(DI06)
15 D5	B5 6		(DI05)
16 D4	B4 5		
17 D3	B3 4		
18 D2	B2 3		
19 D1	B1 2		
1 TE	PE 11		

J2
(DI01) 1
(DI02) 2
(DI03) 3
(DI04) 4

Q4 74S00

T/R3 (TE) 5

Q4

Q2 75162A

T/R1 1	TE 2		
$\overline{SRQ}$ 27	13	SRQ 10	(SRQ)
$\overline{ATN}$ 26	14	ATN 9	(ATN)
$\overline{REN}$ 25	20	REN 3	
$\overline{IFC}$ 24	19	IFC 4	(IFC)
$\overline{DAV}$ 36	16	DAV 7	(DAV)
$\overline{NRFD}$ 37	17	NRFD 6	(NRFD)
$\overline{NDAC}$ 38	18	NDAC 5	(NDAC)
$\overline{EOI}$ 39	15	EOI 8	(EOI)
	12 DC	SC 1	

(EOI) 5
(DAV) 6
(NRFD) 7
(NDAC) 8
(IFC) 9
(SRQ) 10
(ATN) 11
12
(DI05) 13
(DI06) 14
(DI07) 15
(DI08) 16
(REN) 17
18
19
20
21
22
23
24

Q5 74LS367A

J1-19 ← ($\overline{IORD}$) 10 9
J1-20 ← ($\overline{IOWR}$) 6 7
J1-17 ← (Φ12) 14 13
J1-21 ← (RES) 4 5
J1-22 ← (GPIB) 3 2

Q4

T/R2 (CIC) DMAACK 7 → +5V

Q7 74LS74A

+5V, Q4, Q7, Q8-14, Q5, Q9-16, Q1, Q6-20, Q2-22, Q3-40

C1 47
C2 0.1
C3 0.1
C4 0.1
C5 0.1
C6 0.1
C7 0.1
C8 0.1

Q4, Q7, Q8-7, Q5, Q9-8, Q1, Q6-10, Q2-11, Q3-20

442U83054 (Y1)

parts List | 44W83046

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY | TRACED BY | SCALE :
APPROVED BY | DRAWN BY

TITLE A7(OPTION 41) GP-IB Circuit Diagram

DRAWING No. 43W33432 1/1

8

DEP

No. 0023-1985.08

ANRITSU CORP.

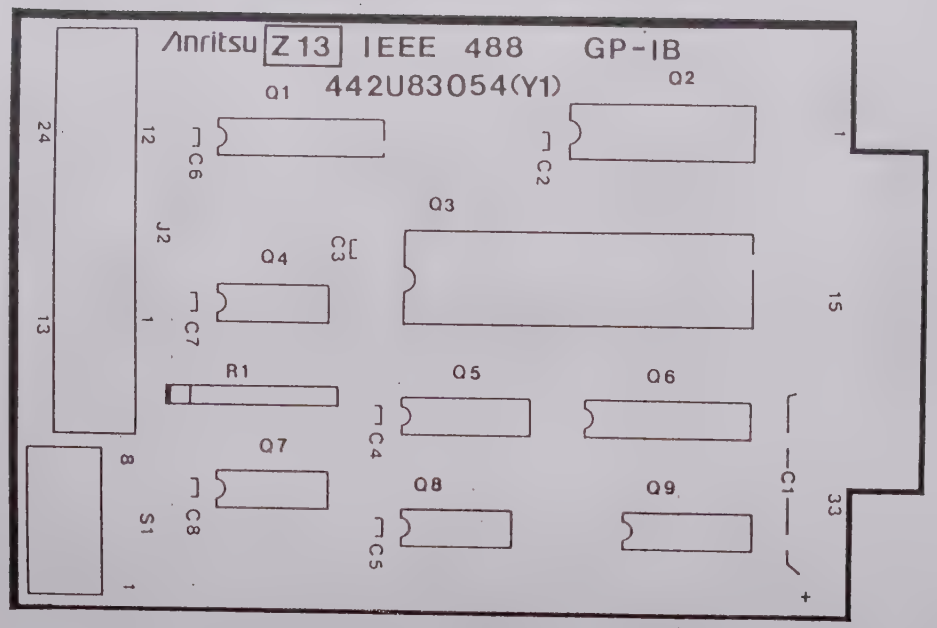


Fig. 3-64 RS-232C PC Board 9 Parts Layout

APPLICATION

REVISIONS

J1

1	(SEL0)	
2	(SEL1)	
3	(DB0)	
4	(DB1)	
5	(DB2)	
6	(DB3)	
7	(DB4)	
8	(DB5)	
9	(DB6)	
10	(DB7)	
11	(ABRQ)	→ Q4-12
12	(AB1)	
13	(AB2)	
14	(AB3)	
15	RS-232C	
16		
17	(Φ12)	→ Q6-14
18		
19	(IORD)	→ Q6-12
20	(IOWR)	→ Q6-10
21	(RES)	→ Q6-6
22		
23	(RxRDY)	→ Q6-5
24	(TXRDY)	→ Q6-3
25		
26		
27		
28		
29		
30		
31		
32		→ Q3-1 (-12V)
33		
34		→ Q3-14 (+12V)

Q2 74LS240

+5V 1 — R1 10K — 2 3 4 5 6 7 8 9

5	15	S2 1
3	17	S2 2
18	2	S2 3
16	4	S2 4
7	13	S2 5
14	6	S2 6
9	11	S2 7
12	8	S2 8
1	19	

S2

1	Character length	ON	8bit
		OFF	7bit
2	Parity Enable	ON	IN
		OFF	DI
3	Even Parity	ON	EVEN
		OFF	ODD
4	Stop Bit	ON ON	1bit
		ON OFF	1bit
5		OFF ON	1½bit
		OFF OFF	2bit
6	Not-used		
7			
8			

Q8 74LS139

2	A	Y3 7
3	B	Y2 6
1	Ḡ	Y1
		Y0

Q8

14	A	Y3
13	B	Y2
15	Ḡ	Y1
		Y0 12

Q7 COM8146

C4 150P	1	X1
X1 5.0688 MHz	2	X2
	10	D
	11	C
	12	B
	13	A
	14	fout
	9	ST

+5V R2 10K — 1 — 5 4 3 2

S1

8	bit 3
4	bit 2
2	bit 1
1	bit 0
C	

Q5 74LS04 — 13 → 12 — 9 → 6 → 5

S1

	BR
0	50
1	75
2	110
3	134.5
4	150
5	300
6	600
7	1200
8	1800
9	2000

C3 33 0.1 — C11 0.1 — C2 33 0.1 — C10 0.1 — C1 47 — C5 0.1 — C6 0.1 — C7 0.1 — C8 0.1 — C9 0.1 — C12 0.1 — C13 0.1

Q4-4, Q7-5, Q1, Q3, Q5-7, Q6, Q8-8, Q2-10

Q7-3, Q1, Q5-14, Q6, Q8-16, Q2-20, Q4-26

Q4 μPD8251A FC

(DB0) 27	D0	
(DB1) 28	D1	
(DB2) 1	D2	
(DB3) 2	D3	
(DB4) 5	D4	
(DB5) 6	D5	
(DB6) 7	D6	
(DB7) 8	D7	
	11	CS
J1-11 (ABR)	12	C/D
	13	RD
J1-19 (IORD)	12	
J1-20 (IOWR)	10	WR
J1-17 (Φ/2)	14	CLK
J1-21 (RES)	6	RESET
J1-23 (RxRDY)	5	RxRDY
J1-24 (TxRDY)	3	TxRDY
	9	TxC
	25	RxC

Q6 74LS367A — 1 → 15 — 11 → 9 → 10 — 13 → 20 — 7 → 21 — 4 → 14 — 2 → 15

Q3 SN75188N

TxD	19	2 → 3 (SD/BA) 2
RTS	23	12 → 13 → 11 (RD/BB) 3
DTR	24	9 → 10 → 8 (RS/CA) 4
		(CS/CB) 5
		(DR/CC) 6

Q1 SN75189AN

RxD	3	3 → 1
CTS	17	6 → 4
DSR	22	11 → 13

J2

1	
(SD/BA) 2	
(RD/BB) 3	
(RS/CA) 4	
(CS/CB) 5	
(DR/CC) 6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
(ER/CD) 20	
21	
22	
23	
24	
25	

442U83056 (Y1)

Parts List 44W83047

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY | TRACED BY | SCALE :

APPROVED BY | DRAWN BY

TITLE A8 (OPTION 43, 44) RS232C

DRAWING No. 43W33433 1/1

9

DEP

No. 0023-1985.08

ANRITSU CORP.

3-113/3-114

3.6 Receiver Troubleshooting and Adjustment

3.6.1 Overall troubleshooting 10

Figure 3-65 is the receiver block diagram. The ME3401A receiver consists of A1 ERROR DET, A2 R-CONTROL, A3 R-DISPLAY, A4 R-SWITCH, A4 JITTER MEASUREMENT, A6 GP-IB, A7 RS-232C, and A8 PRINTER. For details of each circuit, refer to paragraphs 3.6.3 to 3.6.6.

If a problem is indicated by the performance check (operation manual, SECTION 9), locate the fault by using the following procedures.

[Step 1]

When the power switch is turned on, does the POWER-ON lamp come on?

If it does not come on,

AC operation

. AC power cord is not connected to the AC power supply or the AC power cord is disconnected.

. AC fuse on the rear panel is blown.

. AC power circuit (A2 and S1) is defective.

. LED (Q13-A3) is defective.

DC operation

. Abnormal DC supply voltage (specification: -22 to -53 V)

. Connection abnormal between DC power supply and DC input

. POWER circuit (A2 and S1) is defective.

. LED (Q13-A3) is defective.

[Step 2]

When each switch on the front panel is operated, does each display (including LEDs) come on normally?

If it does not come on,

A2 R-CONTROL is defective (paragraph 3.6.2).

A3 R-DISPLAY is defective (paragraph 3.6.4).

[Step 3]

Unless the DS-3 input, DS-1/DS-1C/DS-2 input, unipolar input, pattern, frame, measurement, and alarm detection are normal, A1 ERROR DET is abnormal (paragraph 3.6.3).

[Step 4]

Unless the printer is normal, A8 PRINTER is abnormal (paragraph 3.6.6).

[Step 5]

Unless JITTER MEASUREMENT is normal, A5 JITTER MEASUREMENT (paragraph 3.6.5) or A1 ERROR DET (paragraph 3.6.3) is abnormal.

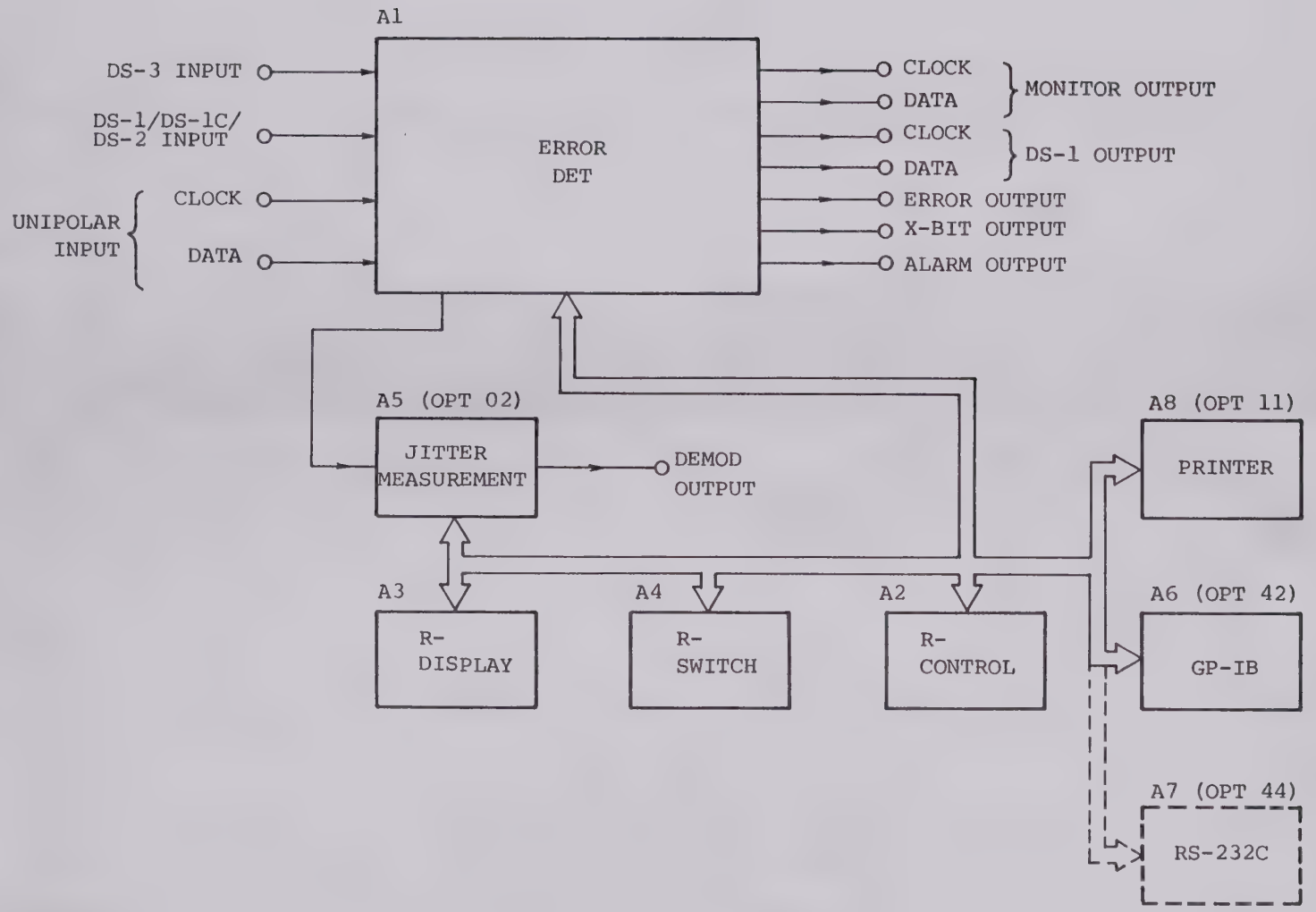


Fig. 3-65 Simplified Block Diagram of ME3401A Receiver

43W36039 1/1

APPLICATION

REVISIONS

AC85-130V 48-63Hz
125VA MAX T2A

POWER ON OFF

S1

Z1 Noise Filter

2A 2A

J21

T1

30V 4.1A 0V

J8

POWER SOURCE DC AC

S2

J9

DC INPUT -22V - -53V 0V

FAN Q1

A2 (J1) (J2) (J3) R-CONTROL 43W37814 11

A3 (J1) R-DISPLAY 43W36042 13

A5 JITTER MEASUREMENT OPT02 14

J19 J18 JITER DEMOD OUTPUT 4bits/1Vp-p 75Ω

J10 J4

A1 (J4) (J3) (J1) (J2) ERROR DET 43W36040 12

UNIPOLAR INPUT CLOCK 75Ω DATA 75Ω

DS-1/DS-1C/DS-2 INPUT DS-1/DS-1C 100Ω DS-2 110Ω

DS-3 INPUT 75Ω

MONITOR OUTPUT DATA TTL 75Ω CLOCK TTL 75Ω

ERROR OUTPUT TTL 75Ω

X-BIT OUTPUT TTL

ALARM OUTPUT TTL

DS-1 OUTPUT DATA TTL 75Ω CLOCK TTL 75Ω

J12 J11 J14 J5

J13 J15 J16 J17 J6

(J5) (J6) (J7) (J8) (J9) (J10)

J22

A7 RS-232C INTERFACE OPT44 9

A6 GP-IB INTERFACE OPT42 8

A8 PRINTER OPT11 16 17 18

A9 DS-1 OUTPUT OPT03

DS-1 OUTPUT 100Ω

J24 J26 J25

B8ZS AMI

S3

A4 R-SWITCH 44W88393 15

J23

J7 J3

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

10

CHECKED BY F. Sugata | TRACED BY | SCALE M-1

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE DIGITAL TRANSMISSION ANALYZER ME3401A Receiver Circuit Diagram.

DRAWING No. 43W36039 1/1

Parts List 44W88389

DEP

No. 0023-1985.08

ANRITSU CORP.

3-119/3-120

3.6.2 A2 R-CONTROL PC board 11

(1) Circuit description

The A2 R-CONTROL circuit consists of the front-panel switches, display, each circuit, GP-IB, RS-232C, printer control circuit, and +5, +12, +24, -5.2, and -12 V power circuits.

(2) Troubleshooting

[Step 1]

Check the waveform between ❶ and ground using an oscilloscope. The waveform shown in Fig. 3-66 is normal. Check the frequency at ❶ using a frequency counter. A frequency of 4.000 MHz is normal. If the waveform and frequency are normal, proceed to the next step. If they are abnormal, troubleshoot the circuits related to Z1, Q54, and Q56.

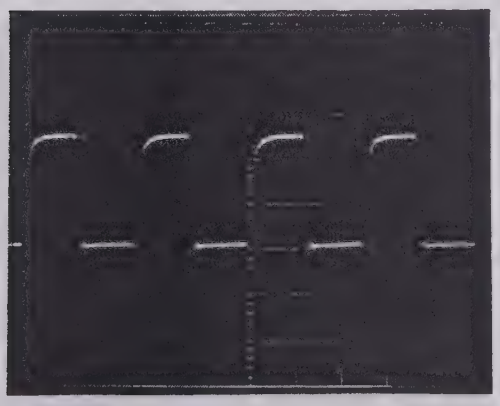


Fig. 3-66 Waveform at ❶

[Step 2]

Check the level between ❷ and ❸, and ground using an oscilloscope. The waveforms shown in Fig. 3-67 are normal.

If the waveforms are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ❷ and ❸.

[Step 3]

Check the waveform between ❹ and ground using an oscilloscope.

The waveforms shown in Fig. 3-67 are normal.

If the waveforms are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to ❹.

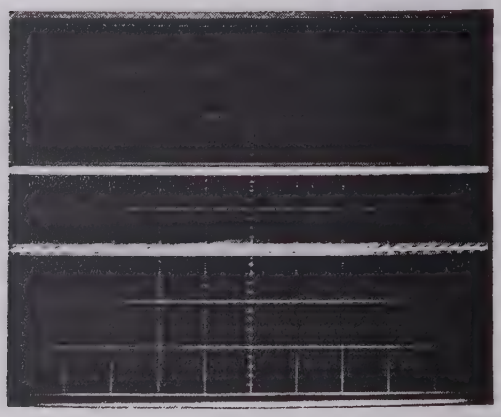


Fig. 3-67 Waveforms at ❹

[Step 4]

Check the voltage between ❺ and ground using a DC voltmeter. A voltage within +2.5 to +4 V is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to Z2 and R60.

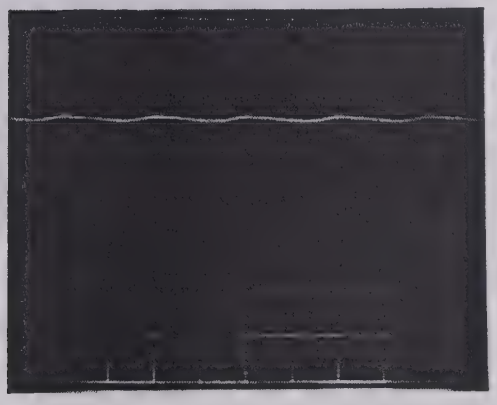
[Step 5]

Check the waveform between ❻ and FG using an oscilloscope.

The waveform shown in Fig. 3-68 is normal. Also, check that the voltage between ❻ and FG is within +30 to +50 V.

If the waveform and voltage are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to ❻.



V: 10 V/div
H: 5 ms/div

Fig. 3-68 Waveform at ❼

[Step 6]

Check the voltage between ❼ and FG using a DC voltmeter. A voltage within +13 to +18 V is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ❼.

[Step 7]

Check the waveform between ❽ and FG using an oscilloscope.

The waveform shown in Fig. 3-69 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ❽.

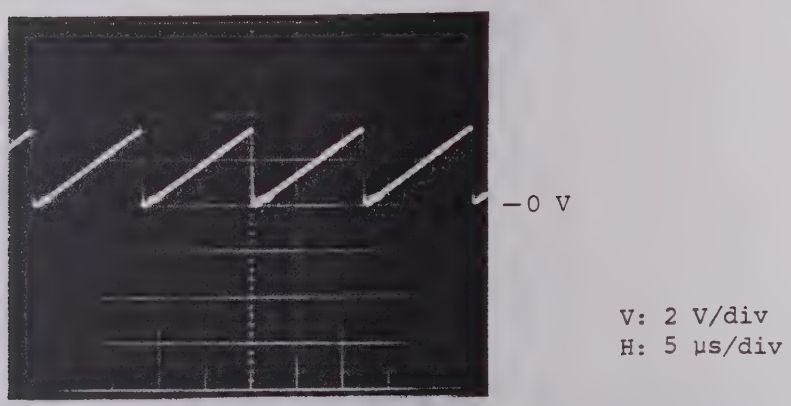


Fig. 3-69 Waveform at ❽

[Step 8]

Check the waveforms between ❾ and ❿, and FG using an oscilloscope. The waveforms shown in Fig. 3-70 are normal. If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ❾ and ❿.

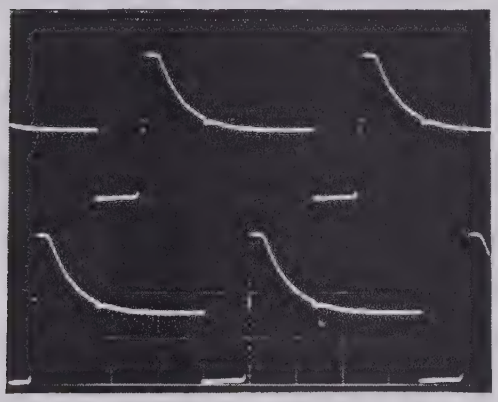


Fig. 3-70 Waveforms at ❾ and ❿

[Step 9]

Check the waveform between ⓫ and FG using an oscilloscope.

The waveform shown in Fig. 3-71 is normal.

If it is normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ⓫.

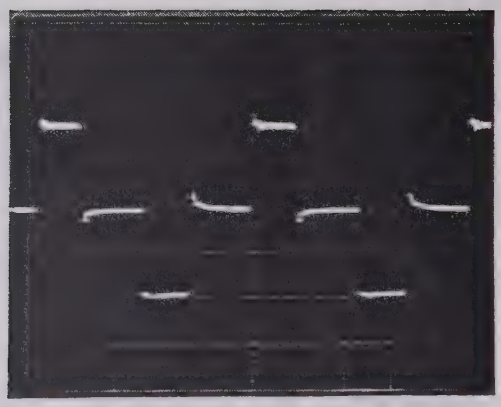


Fig. 3-71 Waveform at ⓫

[Step 10]

Check the waveform between ⓬ and FG using an oscilloscope probe.

The waveform shown in Fig. 3-72 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to ⓬.

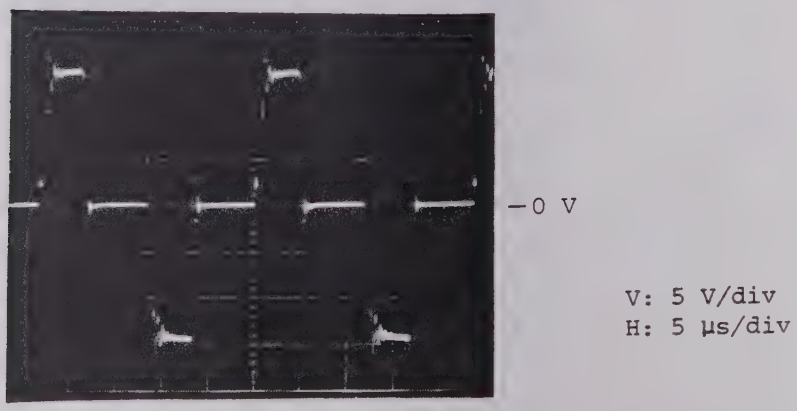


Fig. 3-72 Waveform at ⓬

[Step 11]

Check the voltage between ⑯ and ground using a DC voltmeter.

A voltage within -5.0 to -5.5 V is normal.

If it is normal, proceed to the next step.
If it is abnormal, adjust R40.

If it is still abnormal, troubleshoot circuits ⑫ to ⑯, and ⑱ to ⑮, and the circuit related to R40.

[Step 12]

Check the voltage between ⑬, ⑭, ⑮, ⑰ and grounds using a DC voltmeter.

Test Point	Voltage range
⑭	+4.8 V to +5.5 V
⑮	-11.4 V to -12.6 V
⑯	+11.4 V to +12.6 V
⑱	+22.8 V to +25.2 V

Voltages within the above voltages are normal.
If they are abnormal, troubleshoot the circuits related to ⑬, ⑭, ⑮, and ⑰.

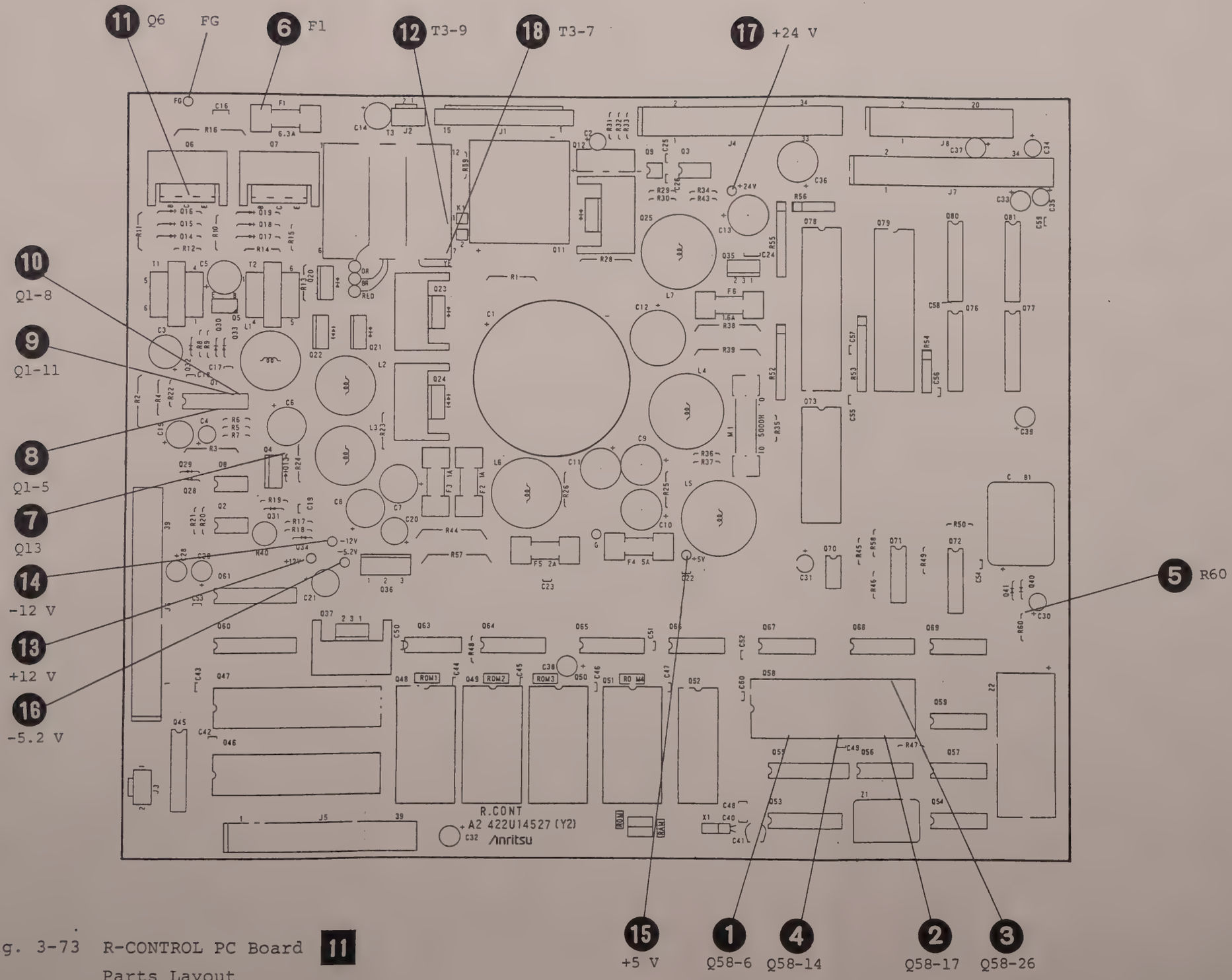


Fig. 3-73 R-CONTROL PC Board 11
Parts Layout

43W37814 1/5

APPLICATION

REVISIONS

ROM1

C49 0.1 +5V Q58 LH0080B

Q59 74LS14

NMI ← Q3-1 (5/5)

C54 0.1 R50 100k +5V

Q72 74LS123

Q70 MB3771

R58 10k +5V

R45 2.74k

R46 1.0k

C31 2.2

RESIN RESET Vs

Q67 TC74HC00AP

HLD → Q53-2 (3/5)

Q67-1 (1/5) → RESET

BAT ← Q40 (1/5)

Z1 8MHz

Q54 74LS74A

Q56 7437 R47 150 → φ

Q54

½CLKB → Q77-8(2/5)

½CLKA → (4/5) Q46-3, Q61-4 (3/5)

INTR ← Q73-17 (2/5)

Q71 74LS04

INT

Q40 1S953 BAT → Q67-14 (1/5), Q52-28 (1/5), Q53-18 (2/5)

R60 1k Q41 1S953 C30 2.2 C52 0.1 Z2 3V

A15 A14 A13 A12 A11 A10 A9 A8 A7 A6 A5 A4 A3 A2 A1 A0

BUSRQ WAIT NMI RESET M1 RD WR IORQ MREQ

D7 D6 D5 D4 D3 D2 D1 D0

HEN ← Q65-11 (3/5)

Q64 74LS139 A4 D0 D1

Q63 74LS74A → Q63

Q64 → ROM4 ROM3 ROM2

A15 R48 10k Q67 74HC00 HLD ← Q67-6 (1/5)

Q48 EPROM64K×8-20C

Q49-27(4/5) Q49-1(4/5)

Q51-20(4/5) Q50-20(4/5) Q49-20(4/5)

C44 0.1 +5V

C60 0.1 BAT Q40 (1/5)

Q52 SRAM32KX8-C

Q55 74LS245

Q68 74LS155

IOWR ← Q79-34, Q73-2 (3/5) (2/5)

IORD ← Q79-5, Q73-3 (3/5) (2/5)

Q46-10 (4/5)

Q46-11 (4/5)

MEMWR 3(4/5)

MEMRD → Q49-22 (2/5)

Q69 74LS32

Q66 74LS08

Q57 74LS74A

INTA → Q73-26 (2/5)

RESET → Q77-2 (2/5)

RESET → Q46-9 (4/5), Q79-35 (3/5), Q81-2 (2/5)

D7 → Q73-4, Q84-19, Q85-9 (2/5) (4/5) (3/5)

D6 → Q73-5, Q84-18, Q85-8 (2/5) (4/5) (3/5)

D5 → Q73-6, Q84-17, Q85-7 (2/5) (4/5) (3/5)

D4 → Q73-7, Q84-16, Q85-6 (2/5) (4/5) (3/5)

D3 → Q73-8, Q84-15, Q85-5 (2/5) (4/5) (3/5)

D2 → Q73-9, Q84-14, Q85-4 (2/5) (4/5) (3/5)

D1 → Q73-10, Q84-12, Q85-3 (2/5) (4/5) (3/5)

D0 → Q73-11, Q84-11, Q85-2 (2/5) (4/5) (3/5)

A14 → 4 (4/5)

A13 → Q49-26 (4/5)

A12 → Q49-2 (4/5)

A11 → Q49-23 (4/5)

A10 → Q49-21 (4/5)

A9 → Q49-24 (4/5)

A8 → Q49-25 (4/5)

A7 → Q49-3, Q60-2, Q85-3 (4/5) (3/5) (3/5)

A6 → Q49-4, Q60-4, Q85-2 (4/5) (3/5) (3/5)

A5 → Q49-5, Q60-6, Q85-1 (4/5) (3/5) (3/5)

A4 → Q49-6, Q60-8, Q69-12 (4/5) (3/5) (3/5)

A3 → Q49-7, Q60-9, Q81-7 (4/5) (3/5) (3/5)

A2 → Q49-8, Q69-3, Q81-15 (4/5) (3/5) (3/5)

A1 → Q49-9, Q60-5, Q81-13 (4/5) (3/5) (3/5)

A0 → Q49-10, Q60-7, Q81-11 (4/5) (3/5) (3/5)

422U14527

Parts List 44W91570

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata | TRACED BY | SCALE :

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A2 R-CONTROL Circuit Diagram. (Receiver)

DRAWING No. 43W37814 1/5

11

DEP

No. 0023-1985.08

ANRITSU CORP.

3-129/3-130

43W37814 2/5

APPLICATION

REVISIONS

8 (GP-IB/RS-232C) 9

J7

Q79-14 (3/5) SELO
Q79-15 (3/5) SEL1

Q65 74LS138

Q76 74LS245

Q81 74LS244

Q77 74LS244

Q54-5 (1/5) ½CLKB

TXRDY → Q73-23(3/5)
RXRDY → Q73-22(3/5)
GP-IB → Q73-21(3/5)

+12V C35 100
-12V C34 100
+5V C33 220

J4

Q79-18 (3/5)
Q79-19 (3/5)
Q79-20 (3/5)
Q79-21 (3/5)

(A4 R-SWITCH) 15

PAT → Q45-19(3/5)
DISP2 → Q46-22(3/5)
DISP1 → Q47-22(3/5)
RMI
IO2 → Q78-6(2/5)
IO1 → Q79-6(3/5)
TIMER → Q53-1(3/5)
MEM → Q64-14(1/5)

Q78 μPD71055C-10

RESET (1/5)Q59-8
IORD (1/5)Q68-5
IOWR (1/5)Q68-6

R55 10k
R52 10k
R56 10k

(3/5)Q79-22
(3/5)Q79-23
(3/5)Q79-24

Q61-3 (3/5)
Q61-2 (3/5)

J6-27 (3/5) TTL:L
J6-28 (3/5) ECL:L

B1 KMB-06

0.1 C55
0.1 C48
0.1 C57

BAT Q40(1/5)
X1 32.768kHz
C41 30P
C40 47P

Q69 74LS32

Q73 μPD8259AC-2

10ms → Q61-17(3/5)
JITTER → Q61-5(3/5)
KEY → Q46-4(4/5)
GP-IB → Q77-7(3/5)
RXRDY → Q77-5(3/5)
TXRDY → Q77-3(3/5)
PRINT → Q79-17(3/5)

Q69-6 (1/5) INTA
Q71-5 (1/5) INTR

Q53 RP5C15

Q65-14 (3/5) TIMER
Q67-6 (1/5) HLD

Q65-12 (2/5) IO2

R49 10k

Q71 74LS04

IS → J6-24(3/5)

(Rear Panel)

+5V → Q54, Q56, Q57, Q59, Q63, Q66, Q69, Q71 — 14
Q64, Q65, Q68, Q72 — 16
Q45, Q55, Q60, Q61, Q76, Q77, Q80, Q81 — 20

Q54, Q56, Q57, Q59, Q63, Q66, Q69, Q71 — 7
Q64, Q65, Q68, Q72 — 8
Q45, Q55, Q60, Q61, Q76, Q77, Q80, Q81 — 10

+5V C38 220 C39 220

DEP

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata — TRACED BY — SCALE :

APPROVED BY E. Sugimoto — DRAWN BY T. Kubota

TITLE A2 R-CONTROL Circuit Diagram (Receiver)

DRAWING No. 43W37814 2/5

11

No. 0023-1985.08

ANRITSU CORP.

3-131/3-132

43W37814 3/5

APPLICATION

REVISIONS

(A1 ERROR DET 12)

J6

Q45 74LS245

Q60 74LS244

Q61 74LS244

Q77 74LS244

Q79 μPD71055C-10

Q80 74LS244

C28 220 +5V -5.2V C29 220

C50 0.1 C51 0.1 C53 0.1 C58 0.1 C59 0.1

C56 0.1 +5V

C36 1000 +24V

C37 220 +5V

R54 10k +5V

R53 10k +5V

J8 (A8 PRINTER OPT II)

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

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APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A2 R-CONTROL Circuit Diagram (Receiver)

DRAWING No. 43W37814 3/5

11

DEP

No. 0023-1985.08

ANRITSU CORP.

3-133/3-134

APPLICATION

REVISIONS

Q46 μPD8279C-2

Q47 μPD8279C-2

J5

(A3 R-DISPLAY 18)

ROM2 Q49 EPROM32KX8-20C

ROM3 Q50 EPROM32KX8 -20C

ROM4 Q51 (1/5) EPROM32KX8 -20C

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY	F. Sugata	TRACED BY	SCALE
APPROVED BY	E. Sugimoto	DRAWN BY	T. Kubota

TITLE: A2 R-CONTROL Circuit Diagram (Receiver)

DRAWING No. 43W37814 4/5

11

DEP

ANRITSU CORP.

43W37814 5/5

APPLICATION

REVISIONS

(Fan) (PW SW)

J2 +12V C14 220 Q5 2SA1154

J3 → Q79-16 (3/5)

J1 F1 6.3A

R3 3.3k R4 100 R2 3.3k Q4 2SC3179

R9 1k R8 680 Q30 RD2.7E

Q13 V039

J5-39 (4/5) V+ Q29 RD13E

C3 22Q

Q28 RD5.1E

J5-40 (4/5) V-

FG

Q1 μPC494C

C18 0.1 R22 2.2k R7 3.3k C4 47 R6 330 C17 1000P R5 12k

R1 4.7k C1 10000 Q11 D5FB20

C5 220 Q32 1S955 Q33 1S955

T1 T2 T3

R11 10 R10 47 R12 100 R13 47 R17 R15 100 R14 10 R18 R19 R16 220 C15 47 C16 1000P

Q16 V19-1 Q15 V19-1 Q14 V19-1 Q17 V19-1 Q18 V19-1 Q19 V19-1

Q6 2SC3220 Q7 2SC3220

C6 680 L1 650μH Q20 D5LC20U-4000

L2 650μH Q21 D8LC20U-4000 F2 1A R44 22 R57 22 C7 1000 R23 1k

Q36 SI-3/22V +12V (0.4A) C20 330

Q22 D8LC20UR-4000 C8 1000 R24 1k L3 550μH F3 1A C21 330

Q37 μPC1632H +5V -12V

L4 100μH L5 100μH F4 5A Q23 D10SC4M +5V (4.5A)

C9 1500 C10 1500 R25 100 C22 0.1

Q24 D10SC4MR C11 1500 R26 100 L6 180μH F5 2A C23 0.1 -5.2V (1.5A)

Q2-4 (5/5) -5.2V +24V

L7 3.5μH F6 1.6A +24V (1A)

Q25 D5LC20U-4000 C12 2200 R38 1k R39 1k C24 0.47 Q35 μPC14324HT C13 1000

R28 3.3k C2 10 R29 330 Q12 RB-152-LFB Q9 PC817X

+5V R30 4.7k K1 R59 220

C25 0.1 Q3 μPC393C NMI → Q59-1 (1/5)

R34 100k R43 10k → +5V R33 10k R31 2.2k R32 2.2k

R17 1.2k R19 470 R20 10k R40 500 C19 0.1 R18 680 Q34 1S953 Q31 RD2.7E R21 220 Q8 PC618 Q2 μPC1251C → C11 (5/5)

DEP

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata | TRACED BY | SCALE :

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A2 R-CONTROL Circuit Diagram. (Receiver)

DRAWING No. 43W37814 5/5

11

No. 0023-1985.08

ANRITSU CORP. 3-137/3-138

3.6.3 A1 ERROR DET PC board 12

(1) Circuit description

Figure 3-74 is the block diagram of this circuit. The A1 ERROR DET circuit consists of INPUT, AGC, B/U CONVERTER, CODE CONVERTER, CLOCK RECOVERY, FRAM synchronization, ERROR DET, OUTPUT, and MEASUREMENT circuits.

Four input circuits (DS-3, DS-1/1C/2, unipolar clock, and unipolar data) shape the waveform of the input signal. The AGC circuit keeps the DS-3, DS-1/1C/2 input signal level constant.

The B/U CONVERTER circuit converts the bipolar signal to a unipolar signal.

The CODE CONVERTER circuit detects errors as well as converts signals with B3ZS, B6ZS, and B8ZS codes to signals without codes.

The clock recovery circuit extracts the clock signal from the unipolar RZ signal.

The frame synchronization circuit synchronizes with the input signal frame and detects the frame errors, parity errors, and CRC-6 errors. The error detection circuit makes bit-by-bit comparison and detects errors after synchronizing the reference pattern signal generated within the input pattern signal.

The MEASUREMENT circuit counts the five types of detected error separately (bit error, frame error, parity error, CRC-6 error, and bipolar error).

CLOCK and DATA are output as the MONITOR output and DATA, CLOCK, ERROR, X-BIT are output as the DS-1 output. The clock signal is also output to the A5 JITTER MEASUREMENT circuit.

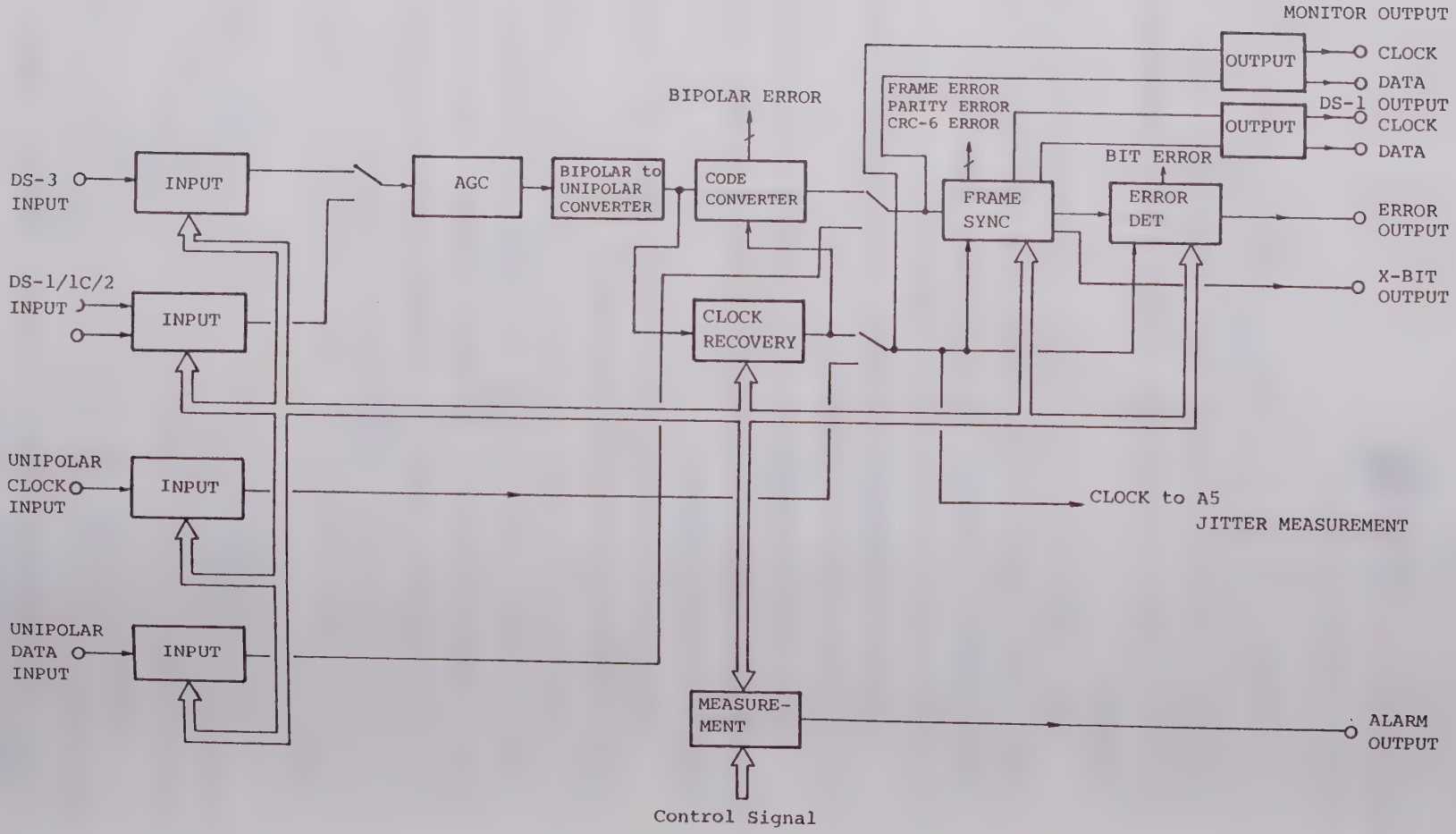


Fig. 3-74 A1 ERROR DET Block Diagram

(2) Troubleshooting and adjustment

(a) Checking DSX-3

Set-up as shown in Fig. 3-75.

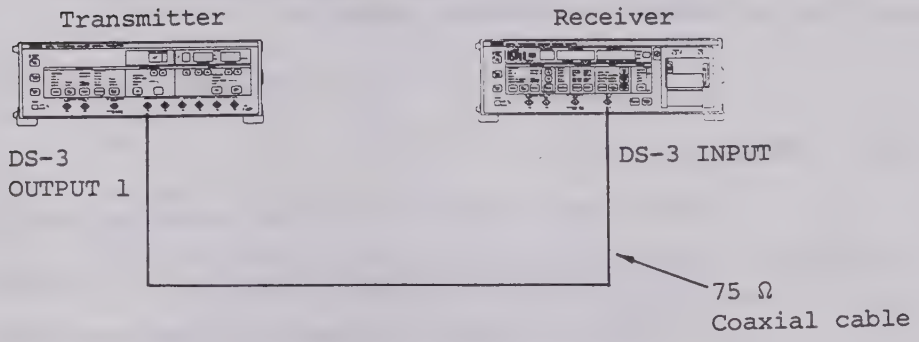


Fig. 3-75 Setup

Set the transmitter and receiver as follows:

Transmitter panel setting

CLOCK	:	DS-3
FRAME	:	FRAMED
PATTERN	:	PRBS
DS-3 LEVEL	:	DSX-3
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Fig. 3-74 A1 ERROR DET Block Diagram

Receiver panel setting

INPUT	:	DSX-3 H/L
FRAME	:	FRAMED
PATTERN	:	PRBS
FUNCTION SWITCH A, B, C (Rear Panel)	:	All "0"

[Step 1]

Check the waveform at ❷ using an oscilloscope.

The waveform shown in Fig. 3-76 is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

Adjust R2 so that the waveform at ❷ is as shown in Fig. 3-76.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to J8 to (2).

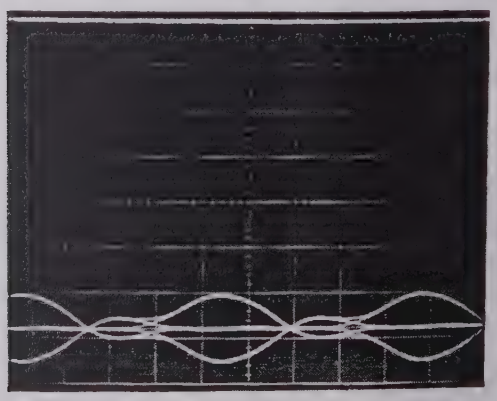


Fig. 3-76 Waveform at ❷

[Step 2]

Check the waveform at ❺ using an oscilloscope.

The waveform shown in Fig. 3-77 is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

Adjust R49 so that the waveform at ❺ is as shown in Fig. 3-77.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to ❷ to ❺.

Fig. 3-77 Waveform at ❺

[Step 3]

Check the waveforms at ❻ and ❼ using the oscilloscope.

The waveforms shown in Fig. 3-78 are normal.

If they are normal, proceed to the next step.

If they are abnormal, make the following adjustment.

Adjustment

1. Adjust R130 so that the waveform at ❻ is as shown in Fig. 3-78.
2. Adjust R118 so that the waveform at ❼ is as shown in Fig. 3-78.

If the waveforms are abnormal after the adjustments described above have been made, troubleshoot the circuits related to ❺ to ❻ and ❺ to ❼.

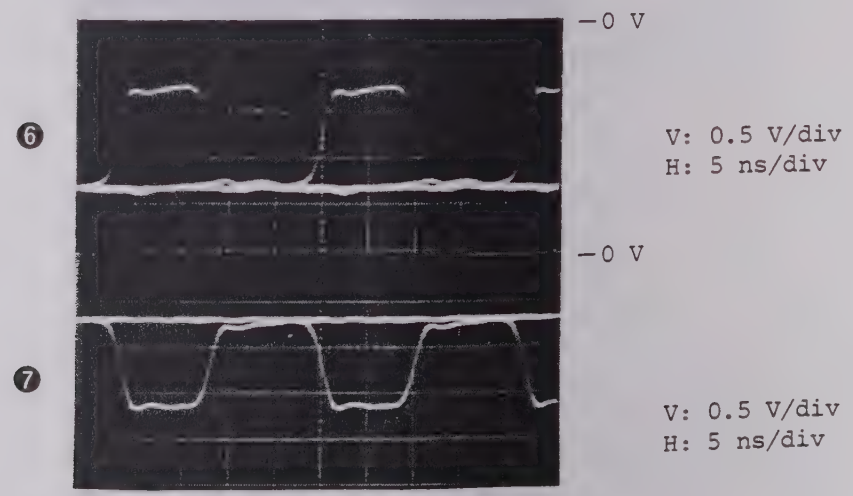


Fig. 3-78 Waveforms at ❻ and ❼

[Step 4]

Check the waveform at ❽ using an oscilloscope probe.

The waveform shown in Fig. 3-79 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❻ to ❽, and ❼ to ❽.

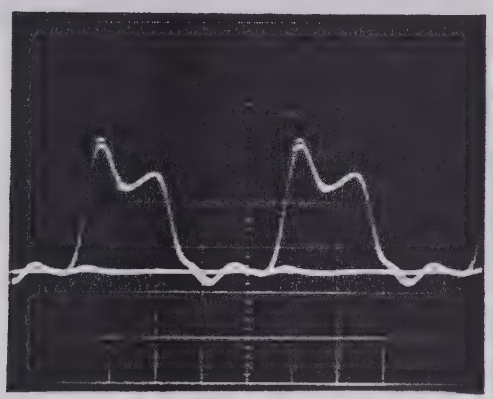


Fig. 3-79 Waveform at ❽

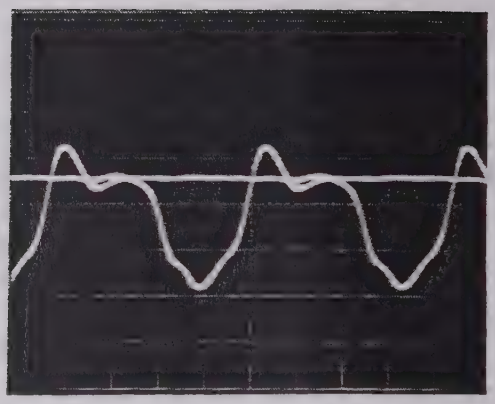
[Step 5]

Check the waveform at ❾ using an oscilloscope probe.

The waveform shown in Fig. 3-80 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❽ and ❾.



V: 0.5 V/div
H: 5 ns/div

Fig. 3-80 Waveform at ❽

[Step 6]

Check the waveform at ⓫ using an oscilloscope.

The waveform shown in Fig. 3-81 is normal.

Also, remove the cable connected to DS-3 INPUT and check the frequency at ⓫ using a frequency counter.

A frequency of 44.288 to 45.183 MHz is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

1. Adjust R147 so that the waveform at ⓫ is as shown in Fig. 3-81.
2. Adjust the frequency at ⓫ according to the following procedures.
   . Remove the cable connected to DS-3 INPUT.
   . Counter J12 to the [FSET] side.

. Adjust R144 so that the frequency at ⓫ is 44.288 to 45.183 MHz.

. Connect J12 to [FADJ] side.

. Turn the power switch off and then turn it on again.

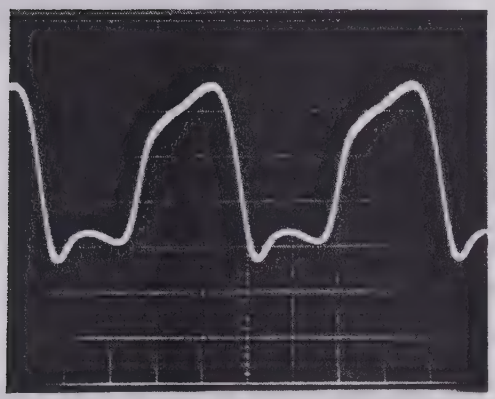


Fig. 3-81 Waveform at ⓫

[Step 7]

Check the waveforms and phases at ⓬ and ⓭ using an oscilloscope.

The waveforms and phases shown in Fig. 3-82 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to Q70 to ⓭, and ❽ to ⓬.

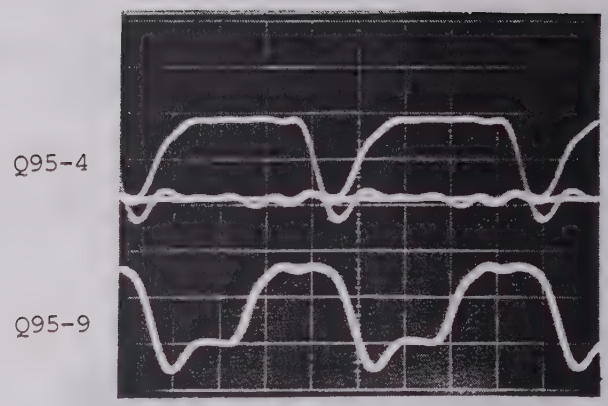


Fig. 3-82 Waveform at ⑫ and ⑬

[Step 8]

Check the waveforms and phases at ⑯ and ⑰ using an oscilloscope. The waveforms and phases shown in Fig. 3-83 are normal. If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to Q95 to ⑯, and Q92 to ⑰.

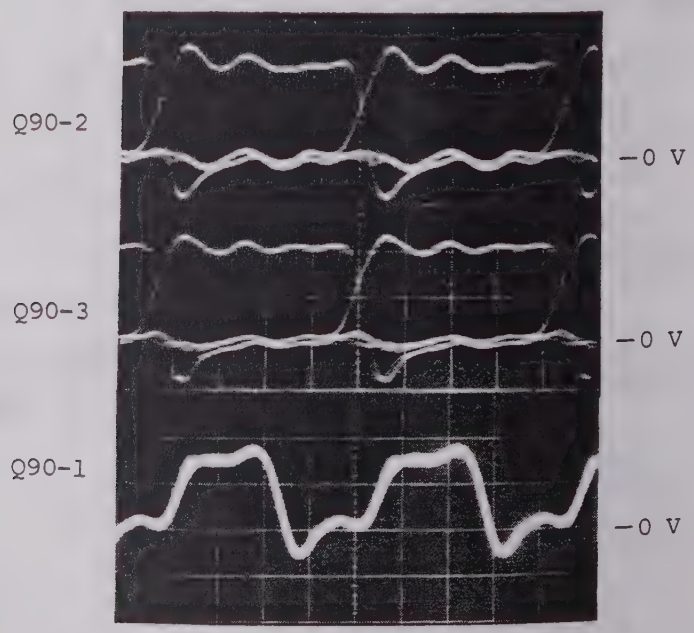


Fig. 3-83 Waveforms at ⑯ and ⑰

[Step 9]

Check the waveform at ⑱ using an oscilloscope probe.

The waveform shown in Fig. 3-84 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuit related to Q90.

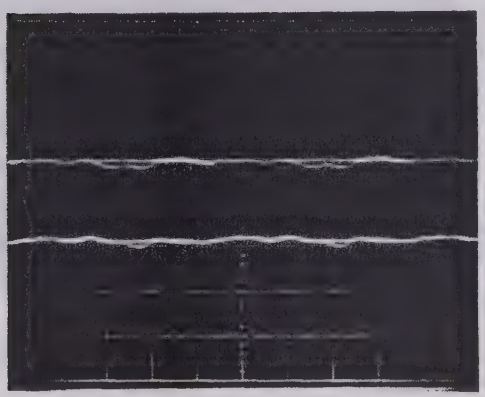


Fig. 3-84 Waveform at ⑱

[Step 10]

Check the waveforms at ⑲, ⑳, ㉑, and ㉒ using an oscilloscope. The waveforms shown in Fig. 3-85 are normal. If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to Q90.

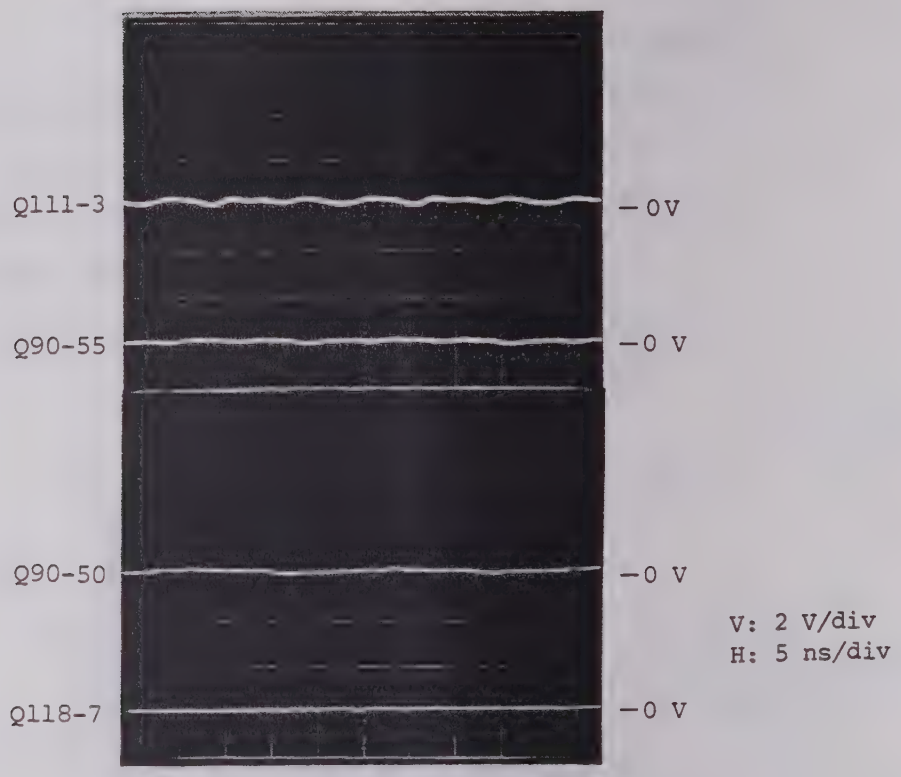


Fig. 3-85 Waveforms at ⑲, ⑳, ㉑, and ㉒

[Step 11]

Check the frequencies at ㉓, ㉔, ㉕, and ㉖ using a frequency counter. The frequencies shown in Table 3-11 are normal. If they are normal, proceed to the next step.

In the following cases, troubleshoot the corresponding circuit.

If ㉓ is abnormal, troubleshoot the circuits related to ⑬ to ㉓

If ㉔ is abnormal, troubleshoot the circuits related to J3-21 to ㉔

If ㉕ is abnormal, troubleshoot the circuits related to J3-21 to ㉕

If ㉖ is abnormal, troubleshoot the circuits related to Q46 to ㉖

Table 3-11 Frequencies at ㉓, ㉔, ㉕ and ㉖

Test point		Frequency
㉓	Q123-18	699 kHz
㉔	Q120-18	2.000 MHz
㉕	Q120-17	100 Hz
㉖	Q46-9	10 Hz

[Step 12]

Check the waveforms at ㉗ using an oscilloscope probe.

The waveforms shown in Fig. 3-86 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ⑳ to ㉗.

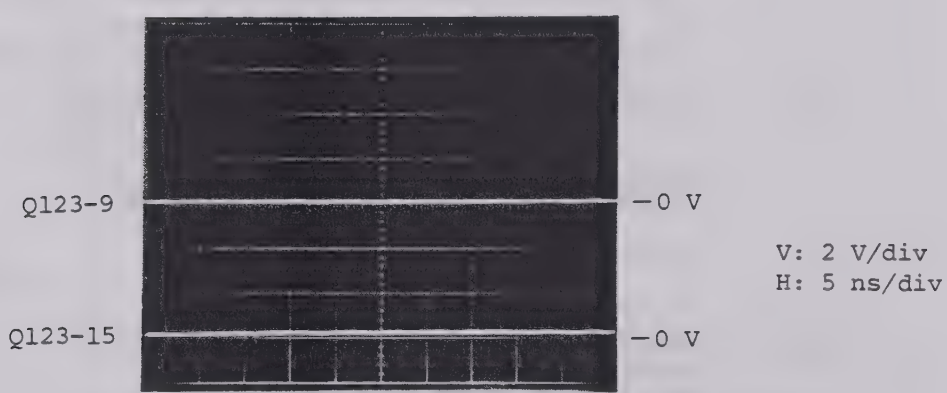


Fig. 3-86 Waveforms at ㉗

[Step 13]

Set the receiver INPUT to UNIPOLAR.

Check the voltage at ㉘ using a DC voltmeter.

A voltage of +9.8 to +10.2 V is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

1. Adjust the voltage at Q91-7 to +2.70 using R186.
2. Adjust the voltage at Q73-6 to +10.0 V using R188.

If the voltage is abnormal after the above adjustments have been made, troubleshoot the circuits related to J3 to ㉘.

[Step 14]

Check the voltage at ㉚ using an oscilloscope.

The voltages shown in Table 3-12 are normal.

If they are normal, DSX-3 is normal.

Table 3-12 Voltages at 3-12 ㉚

	Voltage
Q96-10	H
Q96-11	H
Q96-12	H
Q96-13	H

H: +2 V to +5 V

(b) Checking DS-3

Set-up as shown in Fig. 3-75. Set the transmitter and receiver as follows:

Transmitter panel setting

CLOCK	:	DS-3
FRAME	:	FRAMED
PATTERN	:	PRBS
DS-3 LEVEL	:	HIGH
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Receiver panel setting

INPUT	:	DS-3 H/L
FRAME	:	FRAMED
PATTERN	:	PRBS
FUNCTION SWITCH, A, B, C (Rear Panel)	:	All "0"

[Step 1]

Check the waveform ❶ using an oscilloscope.

The waveform shown in Fig. 3-87 is normal.

If it is normal, check paragraph 3.6.3 (2) (a) step 2 and subsequent steps.

If all are normal, DS-3 is normal.

If they are abnormal, troubleshoot the circuits related to J8 to ❶.

Fig. 3-87 Waveform at ❶

(c) Checking DS-2

Set-up as shown in Fig. 3-88.

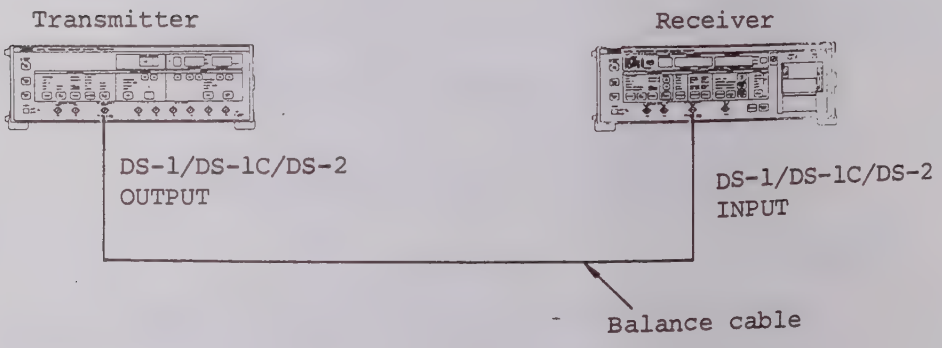


Fig. 3-88 Setup

Set the transmitter and receiver as follows:

Transmitter panel setting

CLOCK	:	DS-2
FRAME	:	FRAMED
PATTERN	:	PRBS
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Receiver panel setting

INPUT	:	DS-2
FRAME	:	FRAMED
PATTERN	:	PRBS
FUNCTION SWITCH, A, B, C (Rear Panel)	:	All "0"

[Step 1]

Check the waveform at ❹ using an oscilloscope probe.

The waveform shown in Fig. 3-89 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to J7 to ❹.

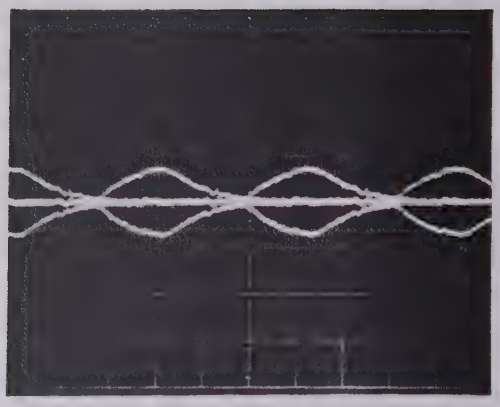


Fig. 3-89 Waveform at ❹

[Step 2]

Check the waveform at ⓫ using an oscilloscope.

The waveform shown in Fig. 3-90 is normal. Also, remove the cable connected to DS-1/1C/2 INPUT and check the frequency at ⓫ using a frequency counter.

A frequency of 6.248 to 6.375 MHz is normal.

If it is normal, check the other items.

If it is abnormal, make the following adjustments.

Adjustment

1. Adjust R158 so that the waveform at ⓫ is as shown in Fig. 3-90.
2. Adjust the frequency at ⓫ using the following procedure.
   - Remove the cable connected to DS-1/1C/2 INPUT.
   - Connect J12 to the [FSET] side.

. Adjust R155 so that the frequency at ⓫ is 6.248 to 6.375 MHz.

. Connect J12 to the [FADJ] side.

. Turn the power switch off and then turn it on again.

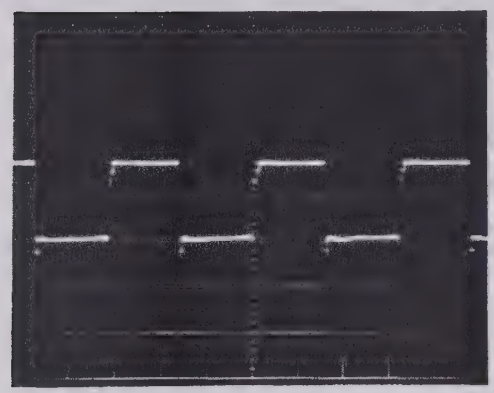


Fig. 3-90 Waveform at ⓫

(d) Checking DS-1C

Set-up as shown in Fig. 3-88.

Set the transmitter and receiver as follows:

Transmitter panel setting

CLOCK	:	DS-1C
FRAME	:	FRAMED
PATTERN	:	PRBS
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Receiver panel setting

INPUT	:	DS-1C
FRAME	:	FRAMED
PATTERN	:	PRBS
FUNCTION SWITCH, A, B, C (Rear Panel)	:	All "0"

[Step 1]

Check the waveform at ❹ using an oscilloscope probe.

The waveform shown in Fig. 3-91 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to J7 to ❹.

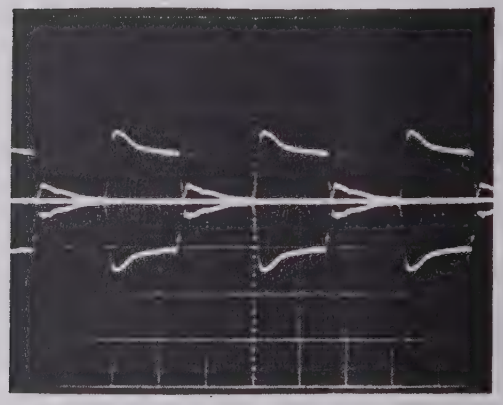


Fig. 3-91 Waveform at ❹

[Step 2]

Check the waveform at ⓫ using an oscilloscope probe.

The waveform shown in Fig. 3-92 is normal.

Also, remove the cable connected to DS-1/1C/2 INPUT and check the frequency at ⓫ using a frequency counter.

A frequency of 3.120 to 3.183 MHz is normal.

If it is normal, check other items.

If it is abnormal, make the following adjustment.

Adjustment

1. Adjust R169 so that the waveform at ⓫ is as shown in Fig. 3-92.
2. Adjust the frequency at ⓫ using the following procedure.
   - Remove the cable connected to DS-1/1C/2 INPUT.
   - Connect J12 to the [FSET] side.
   - Adjust R166 so that the frequency at ⓫ is 3.120 to 3.183 MHz.
   - Connect J12 to the [FADJ] side.
   - Turn the power switch off and then turn it on again.

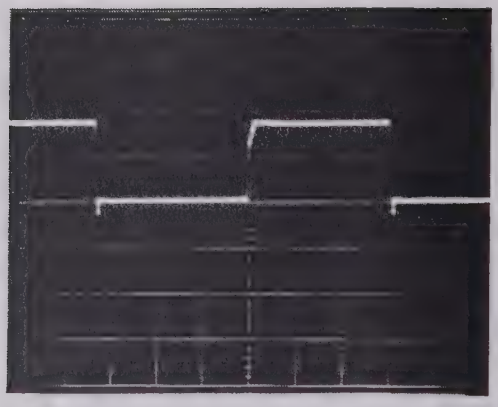


Fig. 3-92 Waveform at ⓫

(e) Checking DS-1

Set-up as shown in Fig. 3-88.

Set the transmitter and receiver as follows:

Transmitter panel setting

CLOCK	:	DS-1
FRAME	:	FRAMED, D4
PATTERN	:	PRBS
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Receiver panel setting

INPUT	:	DS-1
FRAME	:	FRAMED, D4
PATTERN	:	PRBS
FUNCTION SWITCH, A, B, C (Rear Panel)	:	All "0"

[Step 1]

Check the waveform at ❸ using an oscilloscope probe.

The waveform shown in Fig. 3-93 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to J7 to ❸.

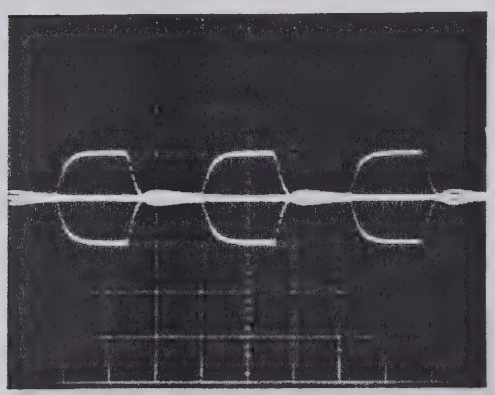


Fig. 3-93 Waveform at ❸

[Step 2]

Check the waveform at ⓫ using an oscilloscope probe.

The waveform shown in Fig. 3-94 is normal.

Also, remove the cable connected to DS-1/1C/2 INPUT and check the frequency at ⓫ using a frequency counter.

A frequency 1.528 to 1.559 MHz is normal.

If it is normal, check the other items.

If it is abnormal, make the following adjustment.

Adjustment

1. Adjust R176 so that the waveform at ⓫ is as shown in Fig. 3-94.
2. Adjust the frequency at ⓫ using the following procedure.
   - Remove the cable connected to DS-1/1C/2 INPUT.
   - Connect J12 to the [FSET] side.
   - Adjust R180 so that the frequency at ⓫ is 1.528 to 1.559 MHz.
   - Connect J12 to the [FADJ] side.
   - Turn the power switch off and then turn it on again.

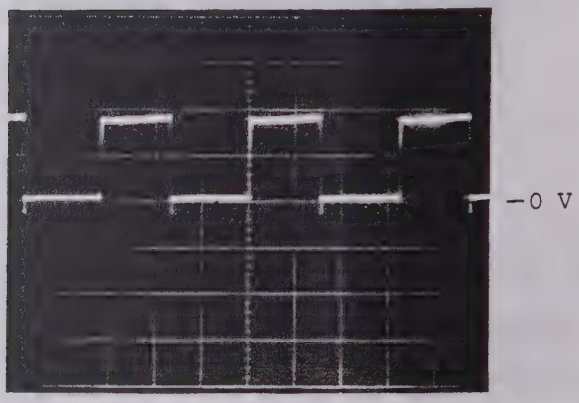


Fig. 3-94 Waveform at ⓫

(f) Checking unipolar

Set-up as shown in Fig. 3-95.

Set the transmitter and receiver as follows:

Transmitter panel setting

CLOCK	:	DS-3
FRAME	:	FRAMED
PATTERN	:	PRBS
ERROR ADDITION	:	OFF
JITTER MODULATION	:	OFF
UNIPOLAR OUTPUT LEVEL (Rear panel)	:	+1/-1 V
FUNCTION SWITCH A (Rear Panel)	:	All "0"

Receiver panel setting

INPUT	:	UNIPOLAR
FRAME	:	FRAMED
PATTERN	:	PRBS
UNIPOLAR INPUT LEVEL (Rear Panel)	:	+1/-1 V
UNIPOLAR INPUT MODE (Rear Panel)	:	FUNCTION SWITCH A1, A2: "0"
FUNCTION SWITCH, A, B, C (Rear Panel)	:	All "0"

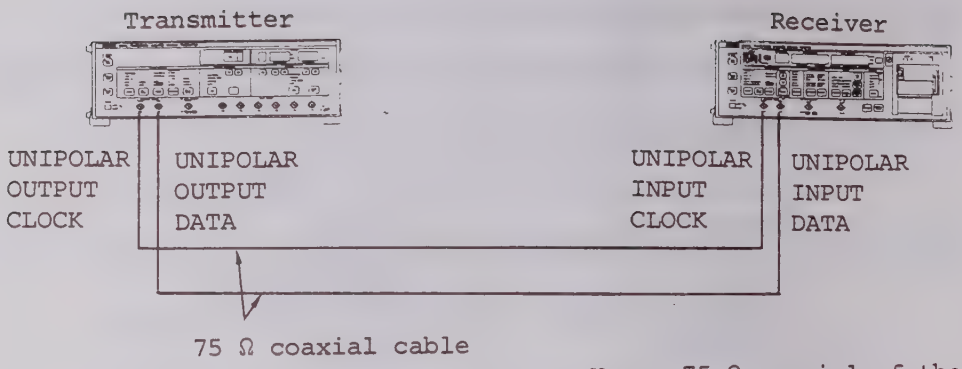

Transmitter
Receiver
UNIPOLAR OUTPUT CLOCK
UNIPOLAR OUTPUT DATA
UNIPOLAR INPUT CLOCK
UNIPOLAR INPUT DATA
75 Ω coaxial cable
Use a 75 Ω coaxial of the same length for the transmitter and receiver.

Fig. 3-95 Setup

[Step 1]

Check the waveform at ⓮ using an oscilloscope.

The waveform shown in Fig. 3-96 is normal.

If it is normal, proceed to the next step.

If it is abnormal, make the following adjustment.

Adjustment

Adjust R70 so that the waveform at ⓮ is as shown in Fig. 3-96.

Note:

If the input level is TTL, adjust R69.
If it is ECL, adjust R73.

If the waveform is abnormal after the adjustment has been made, troubleshoot the circuits related to J6 to ⓮.

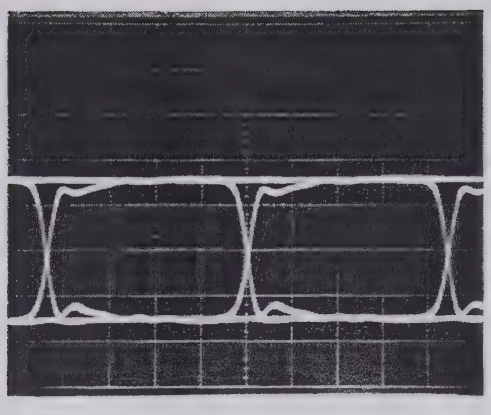


Fig. 3-96 Waveform at ⓮

[Step 2]

Check the waveform at ⓯ using an oscilloscope.

The waveform shown in Fig. 3-97 is normal.

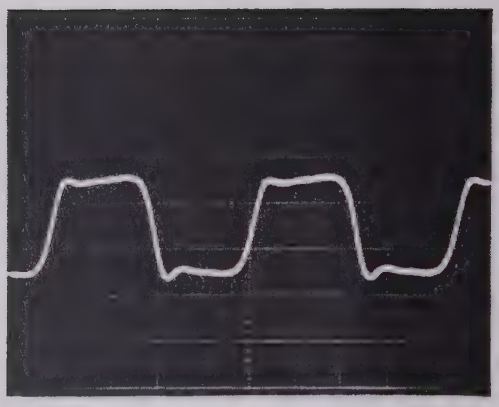
If it is normal, check the other items.

If it is abnormal, make the following adjustment.

Adjustment

Adjust R107 so that the waveform at ⓯ is as shown in Fig. 3-97.

If the waveform is abnormal after the above adjustment has been made, troubleshoot the circuits related to J5 to ⓯.



V: 0.5 V/div
H: 5 ns/div

Fig. 3-97 Waveform at ⓯

(g) Checking control signal

Receiver panel setting

INPUT	:	DSX-1 H/L
FRAME	:	FRAMED
PATTERN	:	PRBS
DEMUX	:	OFF
ERROR	:	BIT
FUNCTION SWITCH, A, B, C (Rear Panel)	:	All "0"

[Step 1]

Check the voltages at ㉙ using an oscilloscope.

The voltages shown in Table 3-13 are normal.

If they are normal, the control signal is normal.

If they are abnormal, troubleshoot the circuits related to J3 to ㉙.

Table 3-13 Voltages at ㉙

Measurement point	Voltages at ㉙
Q96-4	H
Q96-3	H
Q96-2	L
Q96-1	L
Q96-40	L
Q96-39	L
Q96-38	H
Q96-37	L
Q96-18	H
Q96-19	H
Q96-20	H
Q96-21	H
Q96-22	H
Q96-23	L
Q96-24	L
Q96-25	L
Q96-14	H
Q96-15	H
Q96-16	H

H: +2 to +5 V
L: +0.5 V or less

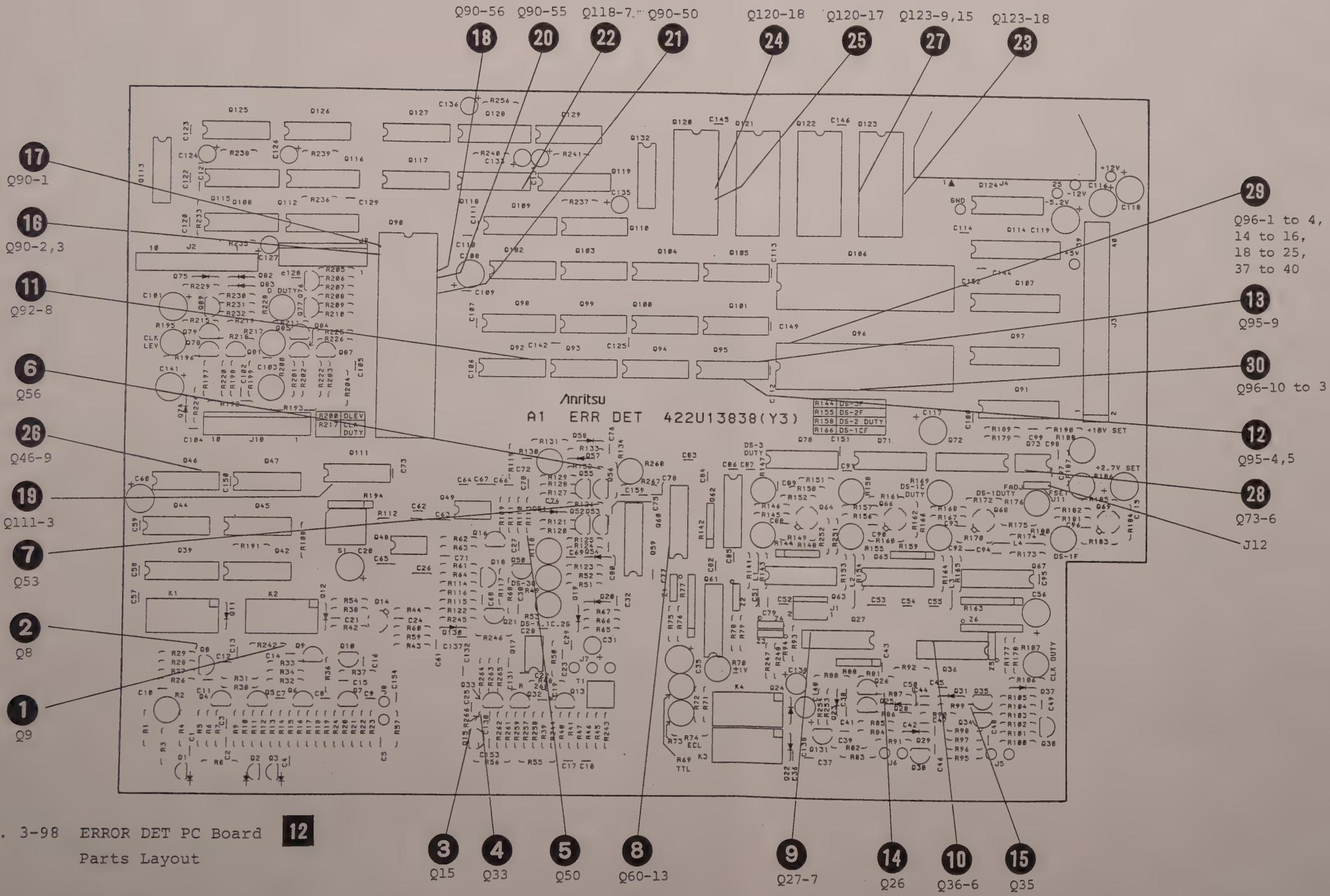


Fig. 3-98 ERROR DET PC Board 12
Parts Layout

APPLICATION

43W36040'5

REVISIONS

DS-3 INPUT

DS-1/DS-1C /DS-2 INPUT

J8 J7 T1

Q1 FC-51M Q2 FC-51M Q3 FC-51M

Q4 2SC1907 Q5 2SC1907 Q6 2SC1907 Q7 2SC1907 Q8 2SC1907 Q9 2SC1907 Q10 2SC1907 Q11 2SC1907 Q12 2SC1907 Q13 2SC1907 Q15 2SC1907 Q16 2SC1907 Q21 2SC1907

Q14 3SK59

Q17 μPC151C Q18 2SC2498 Q19 1S953 Q20 1S953 Q48 μPC1656C Q49 μPC1656C Q50 2SC1907

Q51 1S953 Q52 2SC2498 Q53 2SC2498 Q54 1S953 Q55 2SC2498 Q56 2SC2498 Q57 1S953 Q58 1S953 Q59-5(2/3) Q59-9(2/3)

Q130 1S953

1 2 3 4 5 6 7

-12V +12V -5.2V

422U13838

Parts List 44W88390

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Fujita TRACED BY SCALE

APPROVED BY E. Sugimoto DRAWN BY T. Kyboto M-2

TITLE A1 ERROR DET Circuit Diagram. (Receiver)

DRAWING No 43W36040 1/5

ANRITSU CORP 3-169/3-170

12

DEP

No 0021 1985.08

APPLICATION

REVISIONS

DATA INPUT

CLOCK INPUT

DEP

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FIN.

CHECKED BY F. Sugata — TRACED BY — SCALE M-1

APPROVED BY E. Sugimoto — DRAWN BY T Kubota

TITLE A1 ERROR DET Circuit Diagram. (Receiver)

DRAWING No 43W 36040 2/5

ANRITSU CORP. 3-171/3-172

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APPLICATION

REVISIONS

43W36040 3/5

Q90 AB109CSP

Q106 μPD8255AC-2

Q111 74S00 · Q94 74F02 · Q102 74F00 · Q109 74F153 · Q98 74F175 · Q45 74LS08 · Q104 74F74 · Q103 74F74 · Q100 74F74 · Q99 74F74 · Q105 74LS393 · Q101 74LS393 · Q118 74LS153 · Q128 74LS123 · Q129 74LS08 · Q127 74LS74 · Q117 74LS00 · Q112 74LS157 · Q119 74LS123

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FIN
CHECKED BY F Sugata		TRACED BY		SCALE	
APPROVED BY E. Sugimoto		DRAWN BY T Kubota			
TITLE A1 ERROR DET Circuit Diagram. (Receiver)				DRAWING No 43W 36040 3/5	

12

DEP

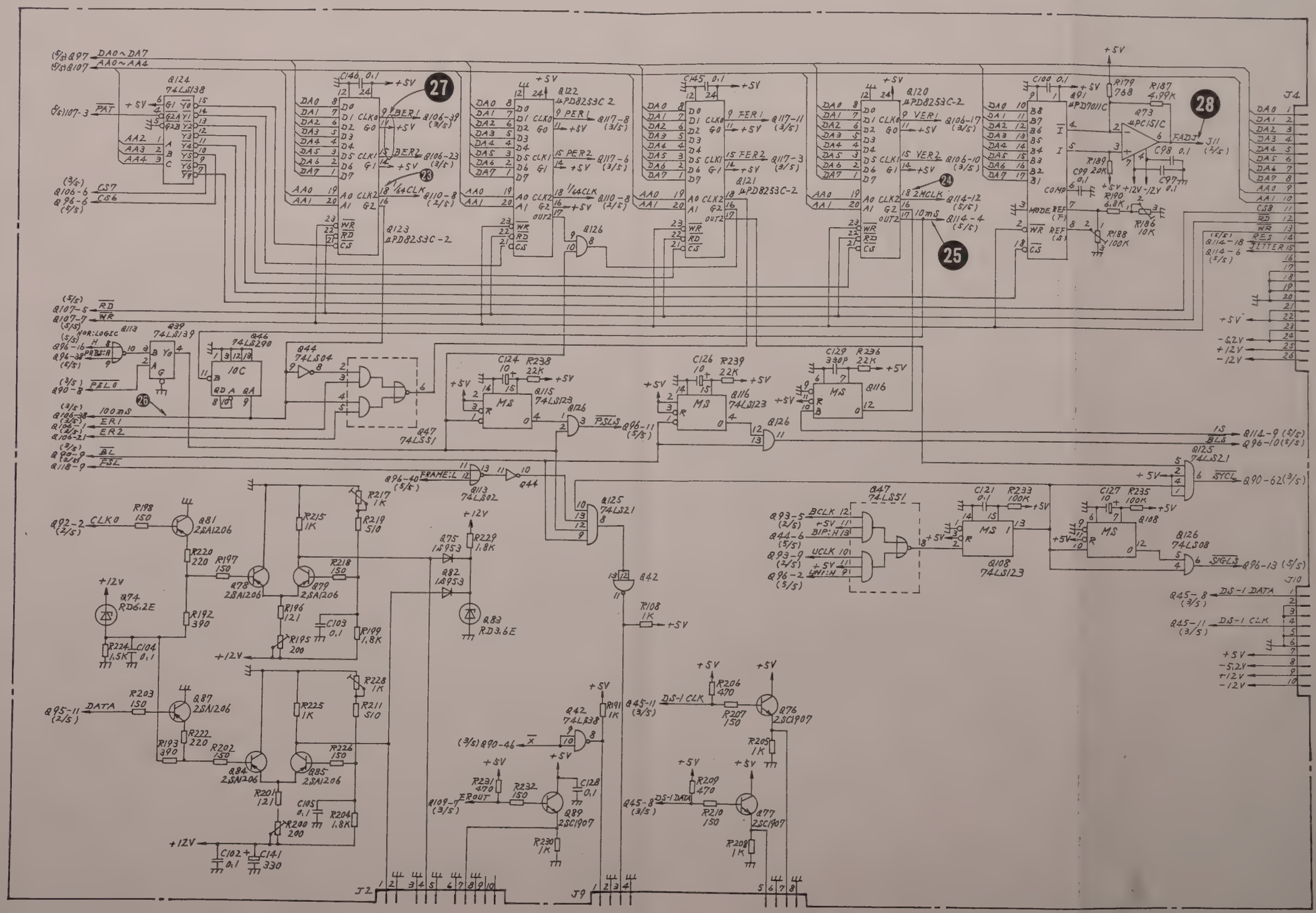
No. 0021-1985 08

ANRITSU CORP. 3-173/3-174

APPLICATION

REVISIONS

43W36040-5



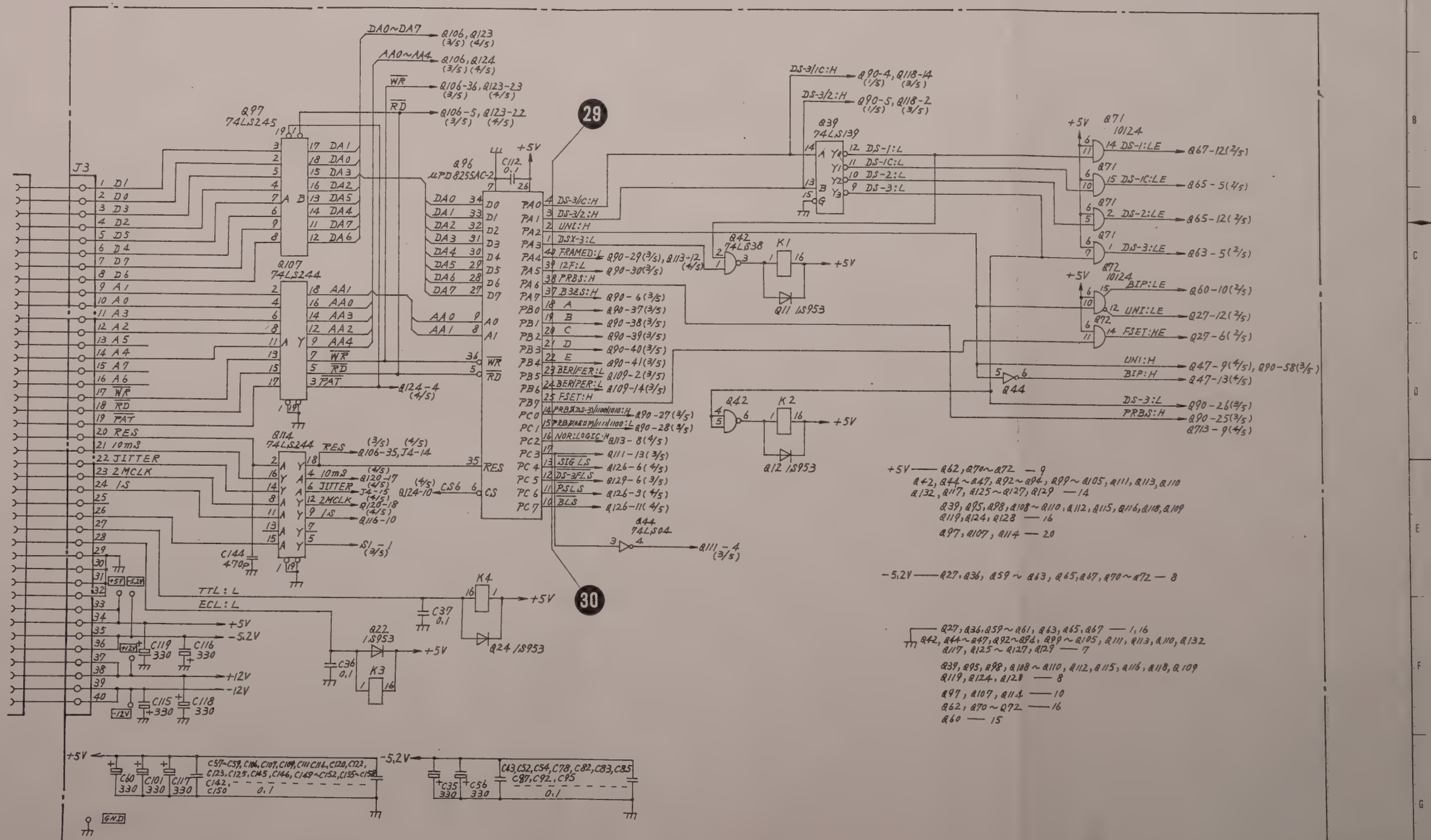
QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FIN
CHECKED BY F. Sugata		TRACED BY		SCALE	
APPROVED BY E. Sugimoto		DRAWN BY T. Kubota			
TITLE A1 ERROR DET Circuit Diagram. (Receiver)				DRAWING No. 43W36040-5	

12

APPLICATION

REVISIONS

43W36040 5



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FIN
CHECKED BY F Sugata			TRACED BY	SCALE	
APPROVED BY E. Sugimoto			DRAWN BY T. Kubota		
TITLE A1 ERROR DET Circuit Diagram. (Receiver)				DRAWING No 43W 36040 5/5	

12

DEP

No 0021 1985 08

3.6.4 A3 R-DISPLAY PC board 13

(1) Circuit description

The A3 R-DISPLAY circuit consists of a detection circuit of the front-panel switch status, and driver circuit for LEDs and the digital display.

(2) Troubleshooting and adjustment

[Step 1]

Check the waveforms at ❶ using an oscilloscope probe.

The waveforms shown in Fig. 3-99 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuit related to Q1.

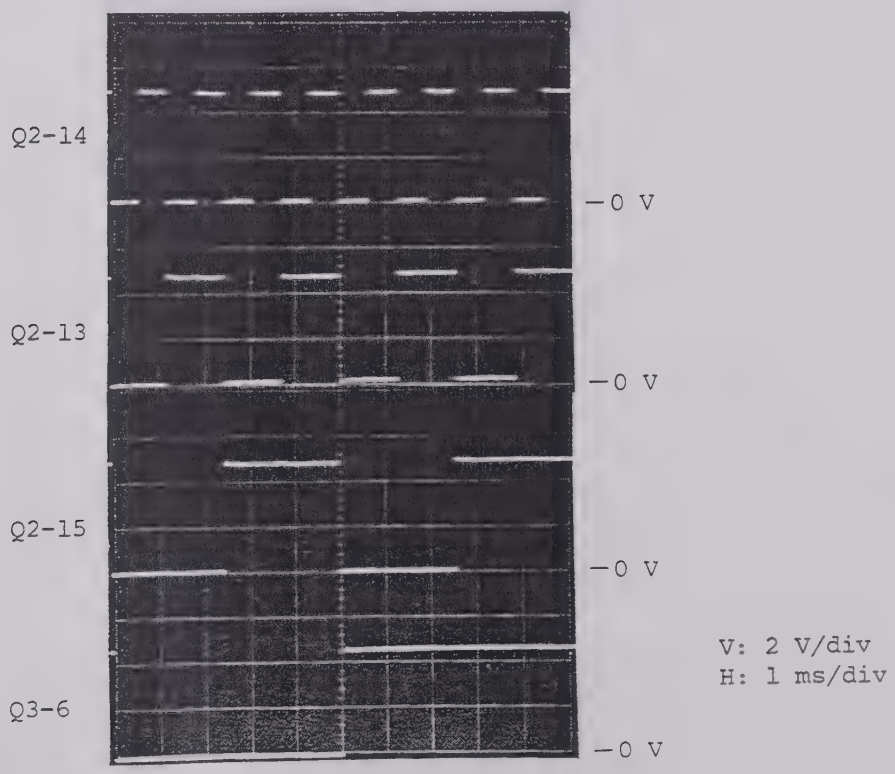


Fig. 3-99 Waveform at ❶

[Step 2]

Use an oscilloscope to check the waveform at ❷ when the [INPUT] key is pressed.

The waveform shown in Fig. 3-100 is normal.

If it is normal, A3 is normal.

If it is abnormal, troubleshoot the circuits related to Q2 and S4.

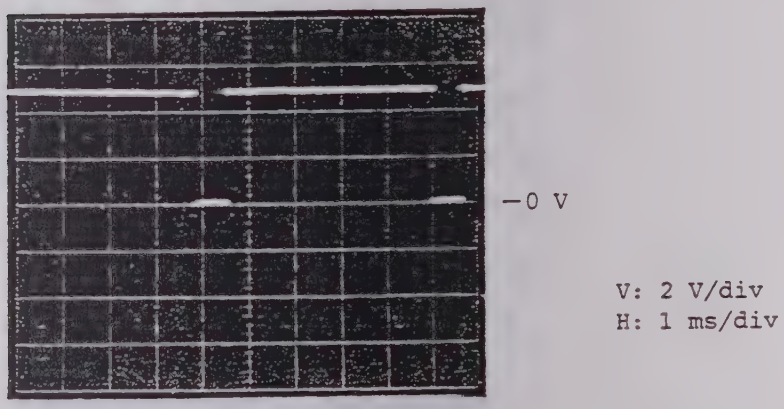


Fig. 3-100 Waveform at ❷

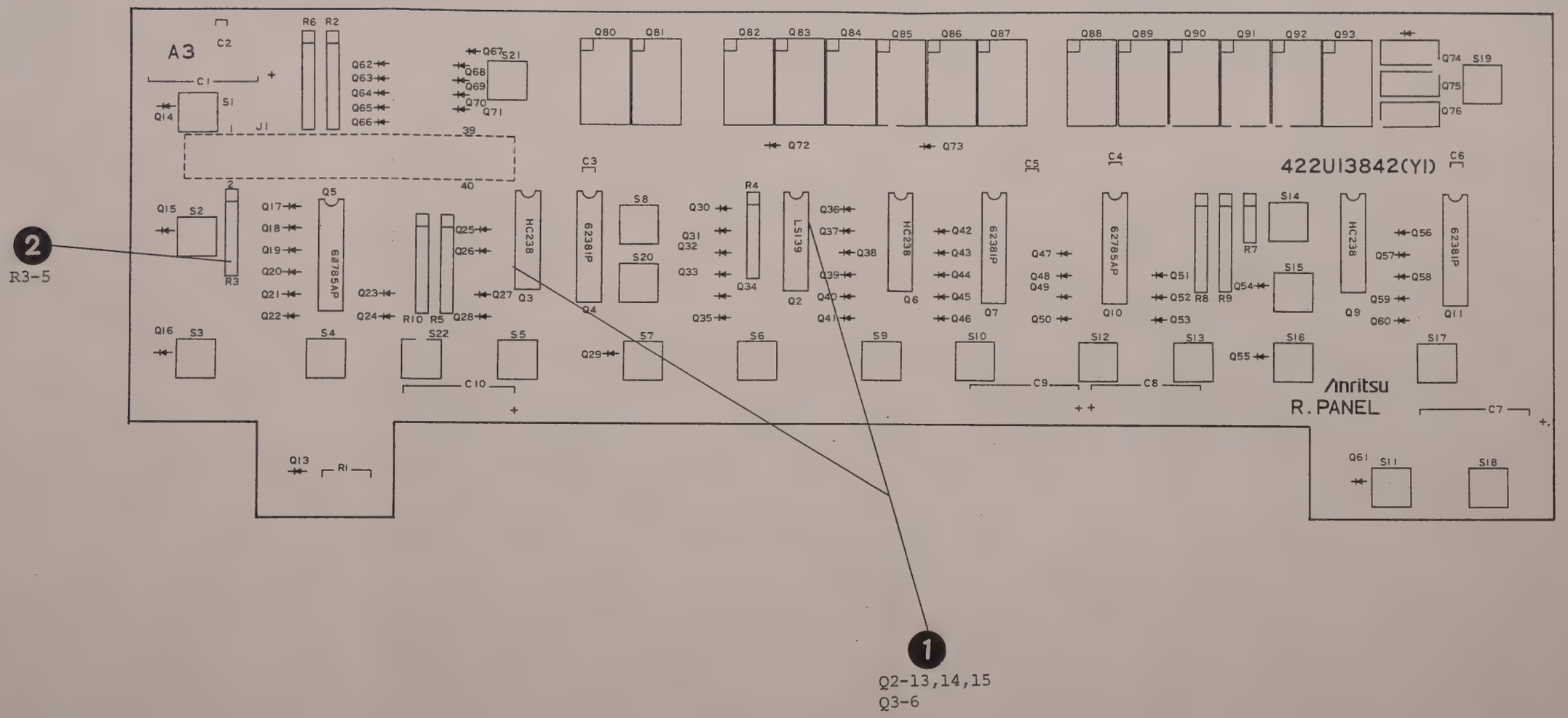


Fig. 3-101 R-DISPLAY PC Board Parts Layout

(3-181 blank)/3-182

43W36042 1/3

APPLICATION

REVISIONS

+5V R3 22k

+5V R4 22k

J1

S4 INPUT
S5 FRAME
S6 PATTERN
S2 PANEL LOCK
S3 AUTO SET
S22 CODE
S7 DEMUX
S8
S9 DISPLAY
S10 ERROR
S11 BUZZER
S1 CONTROL
S12 TIME DISPLAY
S13 MODE
S14 SET
S16 START
S15 PAUSE
S21 HISTORY
S17 MEASUREMENT
S18 MANUAL PRINT
S19
S20

Q14 ~ Q55, Q61 TLR209
Q67 ~ Q71 LN410YP
Q73 LN310GP
Q62 ~ Q66, Q72 LN210RP

Q2 74LS139

Q4 TD62381P

Q3 74HC238

Q5 TD62785AP

R5 33

R1 620

Q13 LN442YPH

+5V

Q9-6(3/3)
Q9-1(3/3)
Q9-2(3/3)
Q9-3(3/3)
Q10-1(3/3)
Q10-2(3/3)
Q10-3(3/3)
Q10-4(3/3)
Q10-5(3/3)
Q10-6(3/3)
Q10-7(3/3)
Q10-8(3/3)

(AB0) R6-7(2/3)
(AB1) R6-6(2/3)
(AB2) R6-5(2/3)
(AB3) R6-4(2/3)
(AB4) R6-3(2/3)
(AB5) R6-2(2/3)
(AB6) R6-1(2/3)
(AB7) R2

Q22 DSX-3 — Q35 PRBS — Q14 CONTROL — Q69 FRAME HIST — Q41 ERRATE — Q46 BIT — Q50 TIMED — Q53 REPEAT
Q21 DS-3 — Q34 1111 — Q29 DEMUX — Q63 FRAME — Q40 ER COUNT — Q45 PARITY — Q49 ELAPSED — Q52 SINGLE
Q20 DS-2 — Q33 1100 — Q66 X-BIT — Q68 SIGNAL HIST — Q39 E'S — Q44 FRAME — Q48 IN TERVAL — Q51 UNTIMED
Q19 DS-1C — Q32 1010 — Q71 BLUE (HIST) — Q62 SIGNAL — Q38 % EFS — Q43 BIP V — Q47 REAL TIME — Q55 START/STOP
Q18 DS-1 — Q31 1000 — Q65 BLUE — Q67 POWER — Q37 TH EFS — Q42 CRC-6 — Q61 BUZZER — Q54 PAUSE/CONT
Q17 UNIPOLAR — Q30 LIVE — Q70 PAT HIST — Q72 ERRORS — Q26 D4 — Q24 AMI — Q28 FRAMED
Q16 AUTO SET — Q15 PANEL LOCK — Q64 PAT — Q73 GATING — Q25 ESF — Q23 B8ZS — Q27 UNFRAMED

Parts List: 44W88392

422U13842

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata — TRACED BY — SCALE :

APPROVED BY E. Sugimoto — DRAWN BY T. Kubota

TITLE A3 R-DISPLAY Circuit Diagram. (Receiver)

DRAWING No. 43W36042 1/3

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DEP

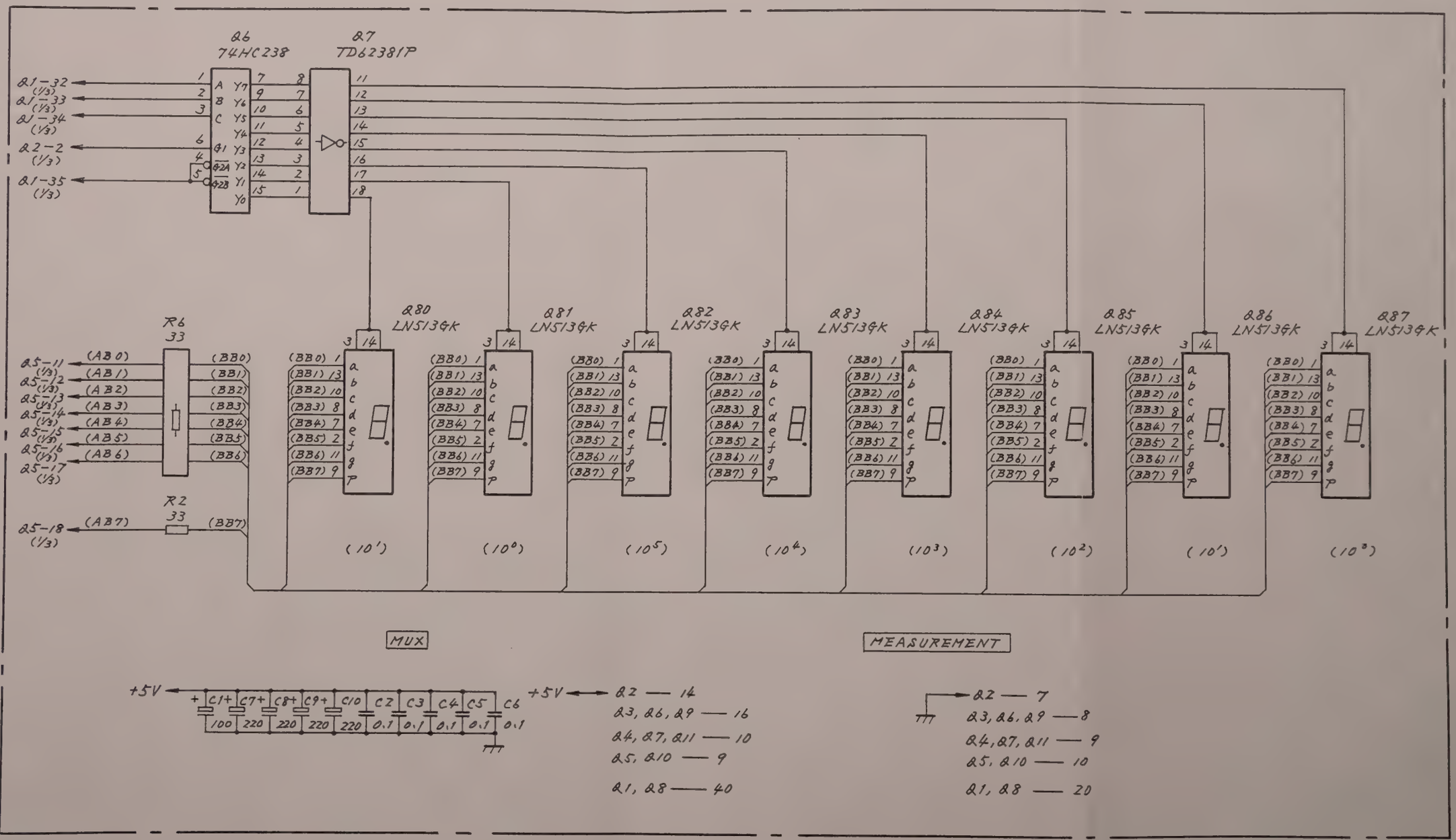
ANRITSU CORP.

3-183/3-184

No. 0023-1985.08

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata | TRACED BY | SCALE :

APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A3 R-DISPLAY Circuit Diagram (Receiver)

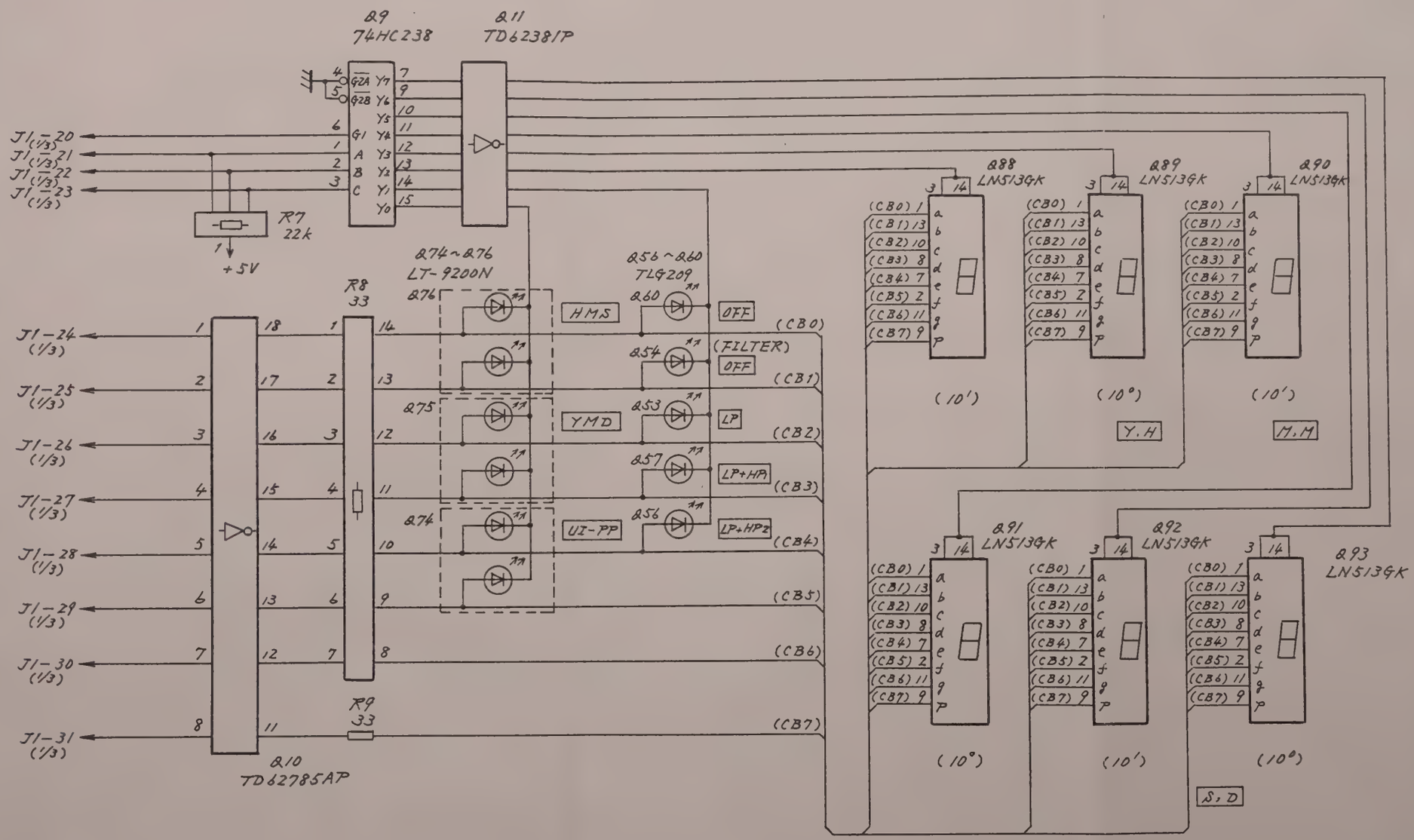
DRAWING No. 43W36042 2/3

13

DEP

APPLICATION

REVISIONS



QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

13

CHECKED BY F. Sugata
TRACED BY
SCALE :
APPROVED BY E. Sugimoto
DRAWN BY T. Kubota

TITLE A3 R-DISPLAY Circuit Diagram. (Receiver)

DRAWING No. 43W36042 3/3

DEP

No. D023-1985.08

ANRITSU CORP.

3-187/3-188

3.6.5 JITTER MEASUREMENT PC board 14

(1) Circuit description

Figure 3-102 shows the block diagram of this circuit. The A5 JITTER MEASUREMENT circuit consists of a frequency division circuit, PD (phase-detection circuit), LPF circuit, VCXO circuit, filter circuit to limit the jitter frequency band, and jitter counting circuit.

This circuit has the same composition as the transmitter A4 JITTER MODULATION circuit.

The 1/N frequency division circuit divides the clock signal by when the jitter is 1 UIp-p or less, divides it by 12 when it is more than UIp-p at DS-3, and divides it by 10 at DS-1/1C/2.

The PD circuit detects the phase difference between the clock signal including the jitter and the reference clock signal.

The LPF circuit extracts the jitter signal.

The VCXO generates the reference clock signal.

The reference clock signal is generated by dividing the VCXO output signal by 12 for DS-1, by 6 for DS-1C, and by 4 for DS-2; It doubles it for DS-3.

Three filter circuits are available: an LP filter to limit the jitter frequency band; an LP filter + HP1 filter; and an LP filter + HP2 filter.

The counting circuit detects the amount of jitter and sends a pulse to display the jitter amount to the A2 T-CONTROL circuit. It also outputs the JITTER DEMOD signal.

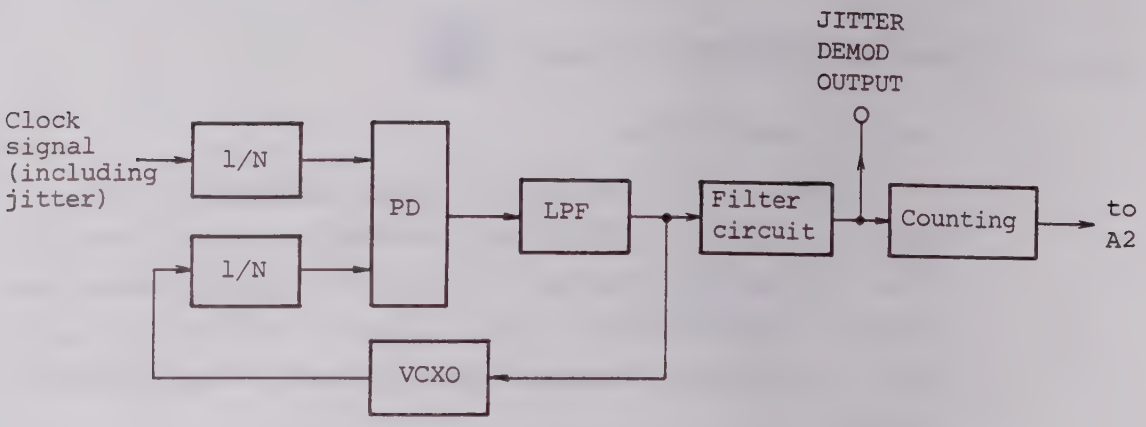


Fig. 3-102 A5 JITTER MEASUREMENT
Block Diagram

(2) Troubleshooting and adjustment

Transmitter panel setting

CLOCK	:	DS-3
JITTER MODULATION	:	MANUAL
FREQUENCY	:	500 Hz
AMPLITUDE	:	4 UIp-p

Receiver panel setting

INPUT	:	DSX-3
JITTER MEASUREMENT	:	OFF (FILTER)

Connection: Set-up as shown in Fig. 3-103.

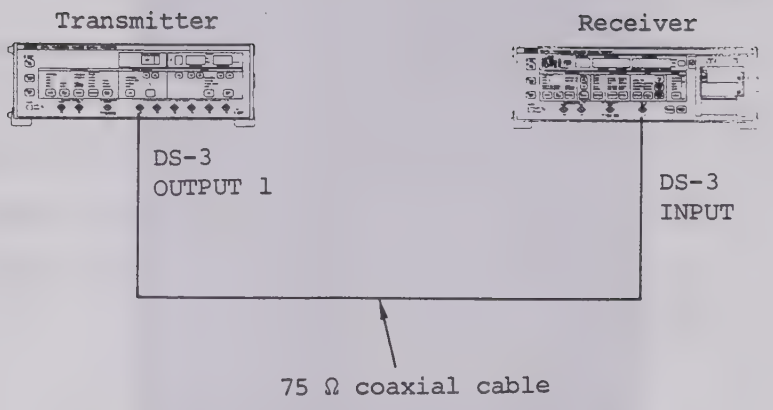


Fig. 3-103 Setup

[Step 1]

Check the waveform at ❶ using an oscilloscope probe.

The waveform shown in Fig. 3-104 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to J2-1 to ❶.

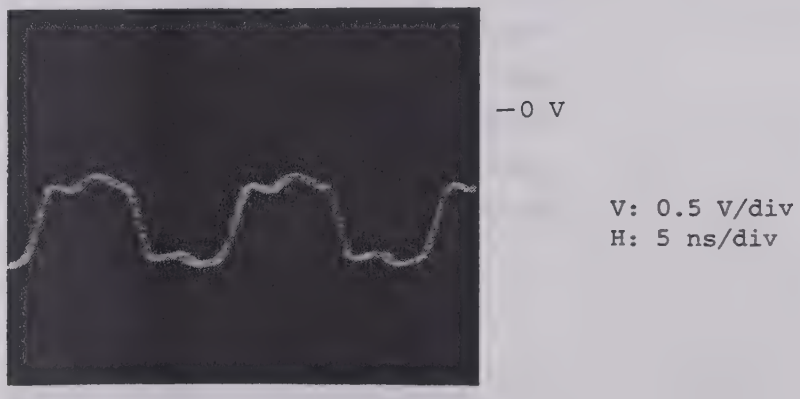


Fig. 3-104 Waveform at ❶

[Step 2]

Check the waveforms at ❷ using an oscilloscope. probe.

The waveforms shown in Fig. 3-105 are normal.

If they are normal, proceed to the next step.

If they are abnormal, troubleshoot the circuits related to ❶ to ❷.

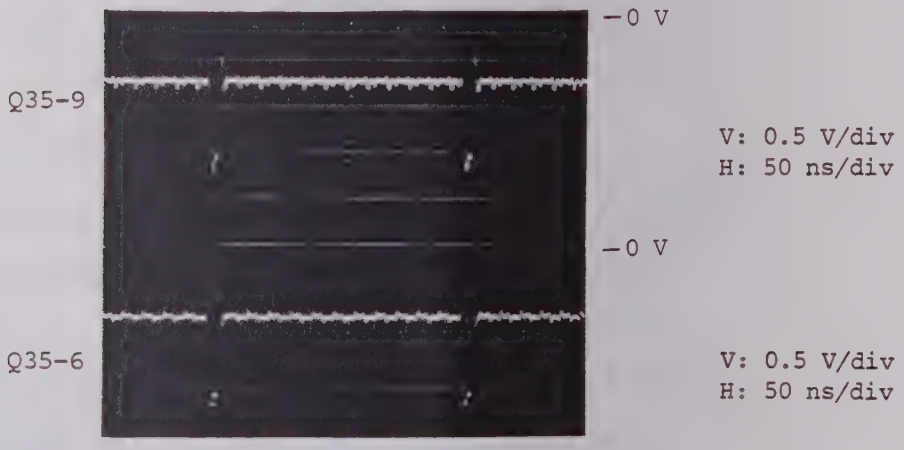


Fig. 3-105 Waveforms at ❷

[Step 3]

Check the waveform at ❸ and ❹ using an oscilloscope probe. The waveforms shown in Fig. 3-106 are normal. If they are normal, proceed to the next step. If they are abnormal, trouble-shoot the circuits related to ❷ to ❸ and Q45.

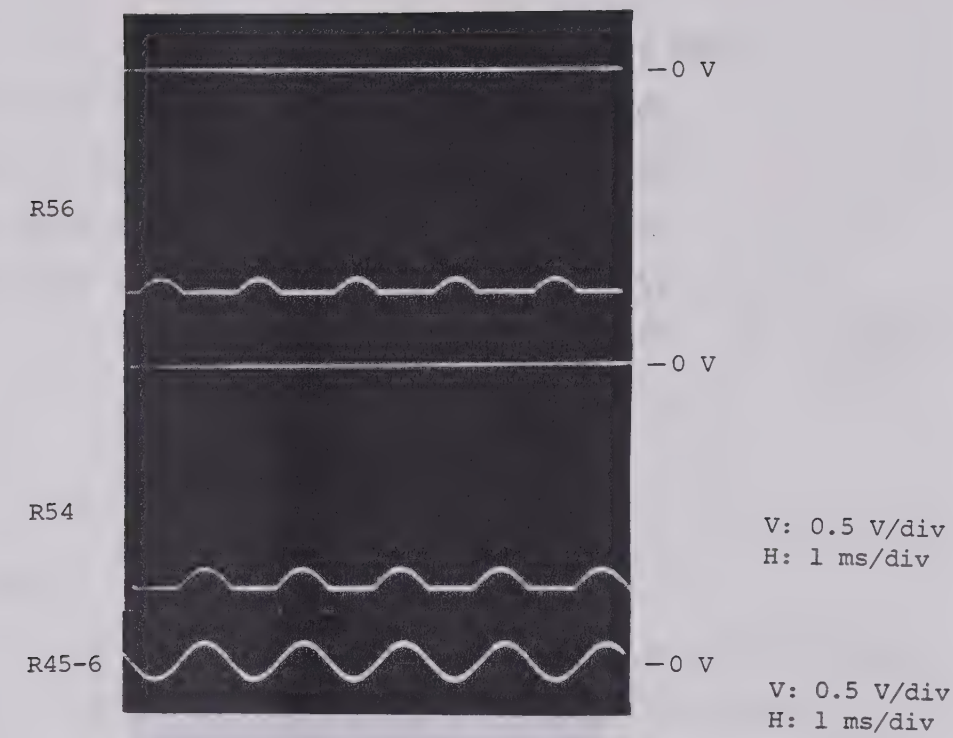


Fig. 3-106 Waveform at ❸ and ❹

[Step 4]

Check the waveform at ❺ using an oscilloscope.

The voltage shown in Fig. 3-107 is normal. If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❹ to ❺ .

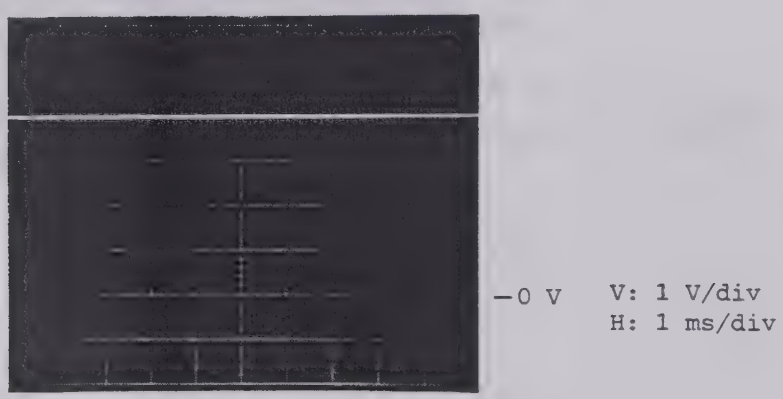


Fig. 3-107 Waveform at ❺

[Step 5]

Check the waveform at ❻ using an oscilloscope.

The waveform shown in Fig. 3-108 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❺ to ❻.

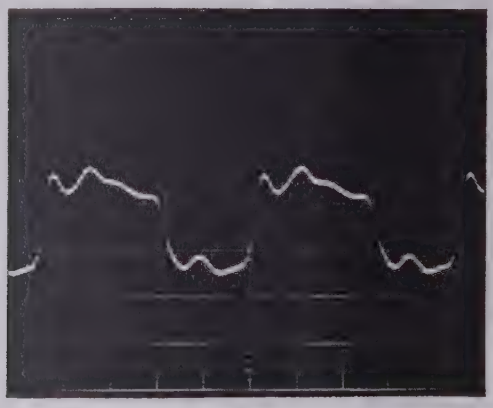


Fig. 3-108 Waveform at ❻

[Step 6]

Check the waveform at ❼ using an oscilloscope.

The waveform shown in Fig. 3-109 is normal.

Also, check the frequency at ❼ using a frequency counter.

A frequency of 44,736 MHz is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❻ to ❼.

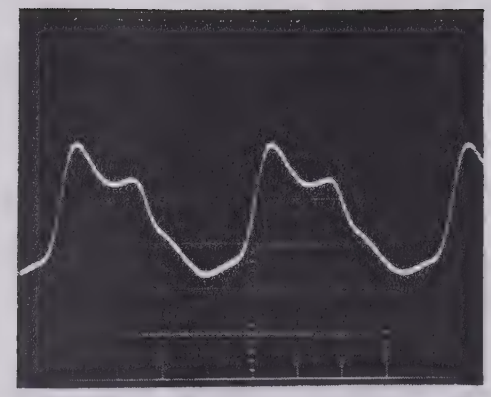


Fig. 3-109 Waveform at ❼

[Step 7]

Check the waveform at ❽ using an oscilloscope.

The waveform shown in Fig. 3-110 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❹ to ❽.

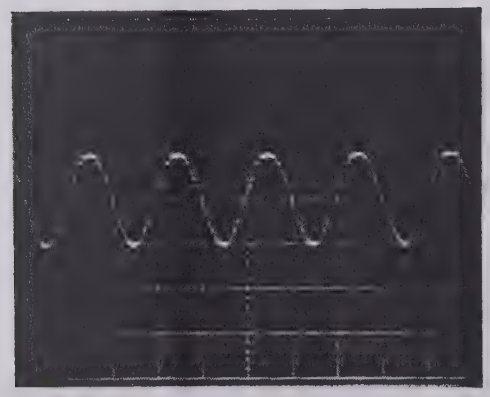


Fig. 3-110 Waveform at ❽

[Step 8]

Check the waveform at ❾ using an oscilloscope.

The waveform shown in Fig. 3-111 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❾.

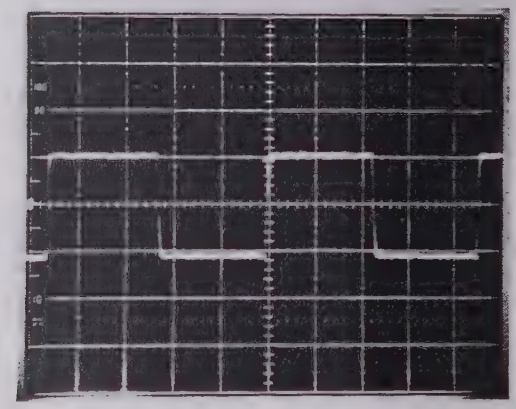


Fig. 3-111 Waveform at ❾

[Step 9]

Check the waveform at ❿ using an oscilloscope.

The waveform shown in Fig. 3-112 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to ❽ to ❿.

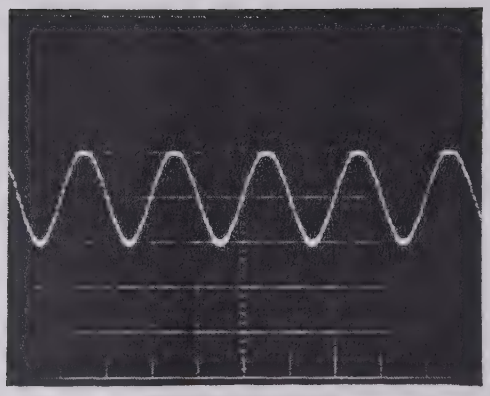


Fig. 3-112 Waveform at ⑩

[Step 10]

Check the waveform at ⑪ using an oscilloscope.

The waveform shown in Fig. 3-113 is normal.

If it is normal, proceed to the next step.

If it is abnormal, troubleshoot the circuits related to Q31.

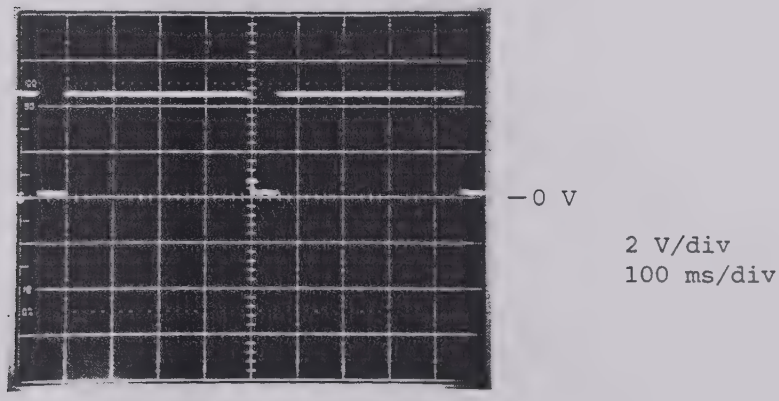


Fig. 3-113 Waveform at ⑪

[Step 11]

Check the voltage at ⑫ using an oscilloscope.

The voltages shown in Table 3-14 are normal.

If they are normal, A5 is normal. If they are abnormal, troubleshoot the circuits related to J1 to ⑫.

Table 3-14 Voltage at ⑫

Test point	Voltage
Q12-19	L
Q12-20	L
Q12-21	L
Q12-22	H
Q12-23	H
Q12-24	L
Q12-25	L

H: +2 V to +5 V

L: 0.5 V or less

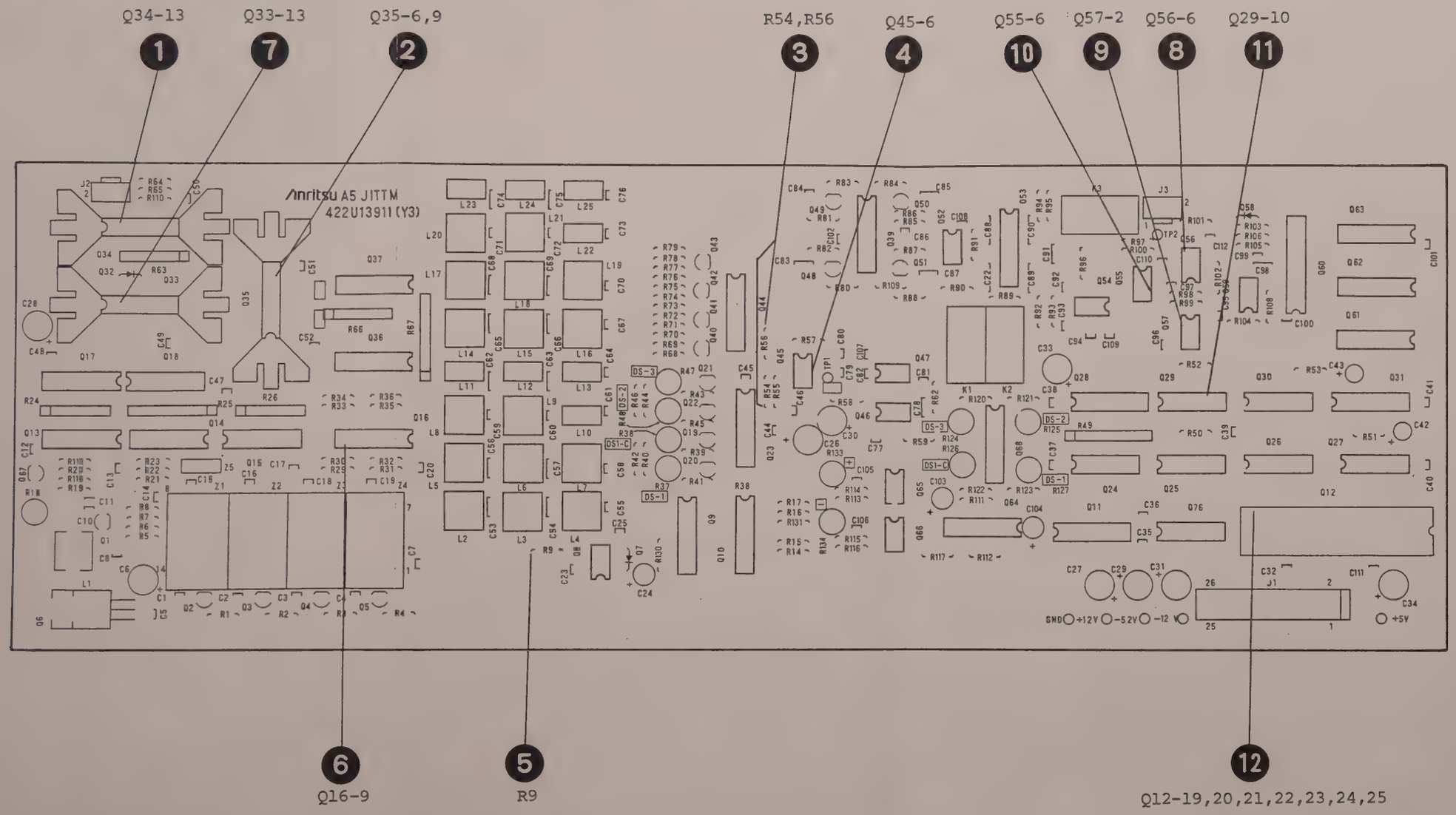


Fig. 3-114 JITTER MEASUREMENT PC Board 14
Parts Layout

(3-199 blank)/3-200

APPLICATION

43W36043 1/3

REVISIONS

(3/3)Q17-14 DS-3.16UI:H
(3/3)Q11-1 1UI:L
(3/3)Q17-3 DS-3.1QUI:H

Q32 1S953
Q34 10136
Q35 MC12040
Q33 10136
Q16 10102
Q37 10102
Q36 10102
Q44 NJU201A
Q23 NJU201A
Q45 HA3-2525
Q9 NJU201AD
Q10 NJU201A
Q8 μPC151C
Q7 1S953
Q6 μPC14305H
Q65 μPC271C
Q66 μPC271C
Q28 TD62003P
Q5 2SA1206
Q4 2SA1206
Q3 2SA1206
Q2 2SA1206
Q1 2SC1907
Q67 2SC1907
Q13 10116
Q14 10105
Q15 10131
Q18 10131
Q43 2SC2718
Q42 2SC2718
Q41 2SC2718
Q40 2SC2718
Q21 2SC2718
Q22 2SC2718
Q39 2SC2718
Q20 2SC2718

J2

Z4 18.528MHz
Z3 18.912MHz
Z2 25.248MHz
Z1 22.368MHz
Z5 Delay

DS-3:LT Q24-2(3/3)
DS-2:LT Q25-6(3/3)
DS-1C:LT Q24-6(3/3)
DS-1:LT Q24-4(3/3)
DS-1C:LE Q11-15(3/3)
DS-2:LE Q14-7(3/3)
DS-1:LE Q11-14(3/3)
DS-3:LE Q11-2(3/3)
DS-1:HE Q11-13(3/3)
DS-1:LE Q36-13(3/3)
DS-2.3:HE Q13-3 Q15(3/3)
DS-3:HE Q11-4(1/3)
Q12-11(3/3)
Q12-25(3/3)
Q12-24(3/3)
Q12-23(3/3)
Q24-8(3/3)

TP1

422W13911

Parts List : 44W88395

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FIN

CHECKED BY F. Sugata | TRACED BY | SCALE
APPROVED BY E. Sugimoto | DRAWN BY T. Kubota

TITLE A5 JITTER MEASUREMENT Circuit Diagram.(Receiver)(OPT02)

DRAWING No 43W36043 1/3

14

ANRITSU CORP. 3-201/3-202

No 0021-1985 08

APPLICATION

REVISIONS

C107 1P Q47 HA3-2525-5 C82 0.1 C81 0.1 +12V −12V

C78 1 Q46 μPC151C R62 470k R58 3.16k Q45-6 (1/3) +12V −12V C77 0.1 R59 470k

R120 2.0k R124 500 R121 1.33k R125 500 R122 1.33k R126 500 R123 1.33k R127 500 Q68 NJU201AD

R109 1.69k Q51 2SC2718 C87 0.0024 R87 6.8k R80 1.69k Q48 2SC2718 C83 0.0024 R82 6.8k R84 1.10k Q50 2SC2718 C85 0.0024 R86 6.8k R83 1.10k Q49 2SC2718 C84 360P R81 6.8k +12V −12V C86 0.1 C102 0.1

Q39 NJU201A

11 (40k) 9 DS-1:LT Q24-4 (3/3)
6 (40k) 8 DS-1C:LT Q24-6 (3/3)
14 (60k) 16 DS-2:LT Q25-6 (3/3)
3 (400k) 1 DS-3:LT Q24-2 (3/3)

DS-3:LT Q24-2 (3/3) DS-2:LT Q25-6 (3/3) DS-1C:LT Q24-6 (3/3) DS-1:LT Q24-4 (3/3)

R88 100k R90 1k C108 6P Q52 HA3-2525-5 R85 1k +12V −12V

R1 C89 0.01 R92 2.00k C22 0.01 R89 10.7k C90 0.01 R94 5.36k C88 0.01 R91 536 C91 1 R95 15.44k

Q53 NJU201A

11 (8k) 9 DS-1:LT Q24-4 (3/3)
6 (1.5k) 8 DS-1C:LT Q24-6 (3/3)
14 (3k) 16 DS-2:LT Q25-6 (3/3)
3 (30k) 1 DS-3:LT Q24-2 (3/3)

+12V −12V

R3 R96 1k R2

C93 0.1 R93 10k Q54 HA3-2525-5 6P C109 C94 0.1 C92 0.1 +12V −12V

R100 10k C110 22P Q55 HA3-2525-5 R97 1k +12V −12V J3

C112 5P R102 3.31k R101 10.0k C97 1P Q56 HA3-2525-5 R99 2.2k R98 2.2k Q29 74LS86 +12V −12V

+5V JITTER J1-15 (3/3) TP2

Q58 1SS52 R103 680 +12V R104 301 Q59 μPC151C R106 3.01k R105 3.01k R108 301 Q60 HA17012 PC

Q57 μPC271C R52 10k Q25 74LS20 C95 0.1 C96 0.1 +12V −12V R50 680 Q24 74LS14 C39 220P

Q31 74LS123 MS R 0 +5V C42 2.2 R51 68k C43 47 R53 22k

Q61 74LS191 Q62 74LS191 Q63 74LS191 L A B C D D/U CK RP G QA QB QC QD

Q30 74LS74 T S 1 D R 0 Q24 74LS14 Q26 R A QD Q76 74LS74 T R 1 D S 0

C99 0.1 C98 47P C100 0.1 −12V +12V

Q27-1 (3/3)

DEP

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata TRACED BY

APPROVED BY E. Sugimoto DRAWN BY T. Kubota

SCALE : M-1

TITLE A5 JITTER MEASUREMENT Circuit Diagram (Receiver) (OPT 02)

DRAWING No. 43W36043 2/3

14

ANRITSU CORP.

3-203/3-204

APPLICATION

REVISIONS

J1 -12V +12V -5.2V +5V

C30 C31 C26 C27 C28 C29 C33 C34 330

C111 470P

Q12 μPD8255AC-2

RESET WR RD CS A1 A0 PA0 PA1 PA2 PA3 PA4 PA5 PA6 PA7 PC0 PC1 PC2 PC3 PC4 PC5 PC6 PC7 PB0 PB1 PB2 PB3 PB4 PB5 PB6 PB7 D7 D6 D5 D4 D3 D2 D1 D0

15 JITTER → Q29-8

14 RESET

13 WR

12 RD

11 CS

10 A1

9 A0

8 D7 7 D6 6 D5 5 D4 4 D3 3 D2 2 D1 1 D0

Q76-5 (2/3)

Q27 74LS393 Q27 Q26 74LS393

R QA QB QC QD

C32 0.1 +5V

R49 4.7k

Q29 — 6 (1/3)

Q28 TD62003P

OFF:L → K1

LP+HP1:H → Q29 74LS86 → Q28 → K3

LP+HP2IHZ 1UI:L → Q28 → K2

DS-3:HT → Q28-1 (1/3)

DS-1:HT → Q28-2 (1/3)

DS-1C:HT → Q28-5 (1/3)

Q24 74LS14

Q25 74LS20

DS-2:HT → Q28-7 (1/3)

+5V

C36 C37 C38 C40 C41 C101 C13 C17 C20 C35 C47 C48 C49 C50 C52 0.1

+5V → Q11 — 9; Q24~Q27, Q29, Q30 — 14; Q31 — 16

-5.2V → Q35 — 7; Q11, Q13~Q18, Q33, Q34; Q36, Q37 — 8

Q24~Q27, Q29, Q30 — 7; Q11 — 16; Q35 — 1, 14; Q13~Q18, Q33, Q34, Q36, Q37 — 1, 16; Q31 — 8

Q34-11 (1/3)

Q11 10124

R24 680

Q17 10102

DS-3·10UI:H → Q34-6(1/3)

DS-3·16UI:H → Q34-5(1/3)

DS-3:LE → Q16-13(1/3) Q17-13(1/3)

DS-3:HE → Q18-12(1/3)

DS-1:LE → Q16-4(1/3) Q18-4(1/3)

DS-1:HE → Q14-4(1/3)

DS-1C:LE → Q37-10(1/3)

Q13 10116

DS-2,3:HE → Q15-5(1/3)

Q14 10105

DS-3:LT → Q10-9(1/3), Q39-1(7/8), Q44-1(1/3), Q53-1(7/8), Q68-1(7/8), Q75-8(7/8)

DS-1:LT → Q10-1(1/3), Q39-9(7/8), Q44-9(1/3), Q53-9(7/8), Q68-9(7/8)

DS-1C:LT → Q10-16(1/3), Q39-8(7/8), Q44-8(1/3), Q53-8(7/8), Q68-8(7/8)

DS-2:LT → Q10-8(1/3), Q39-16(7/8), Q44-16(1/3), Q53-16(7/8), Q68-16(7/8)

R25 680

DS-2:LE → Q16-10(1/3)

-5.2V

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY F. Sugata — TRACED BY — SCALE :

APPROVED BY E. Sugimoto — DRAWN BY T. Kubota

TITLE A5 JITTER MEASUREMENT Circuit Diagram (Receiver) (OPT 02)

DRAWING No. 43W36043 3/3

14

DEP

ANRITSU CORP.

3.6.6 A4 R-SWITCH PC board 15,
A8 PRINTER UNIT 16, PRINTER INTERFACE 17,
PRINTER CONTROL 18 and A9 DS-1 OUTPUT 19

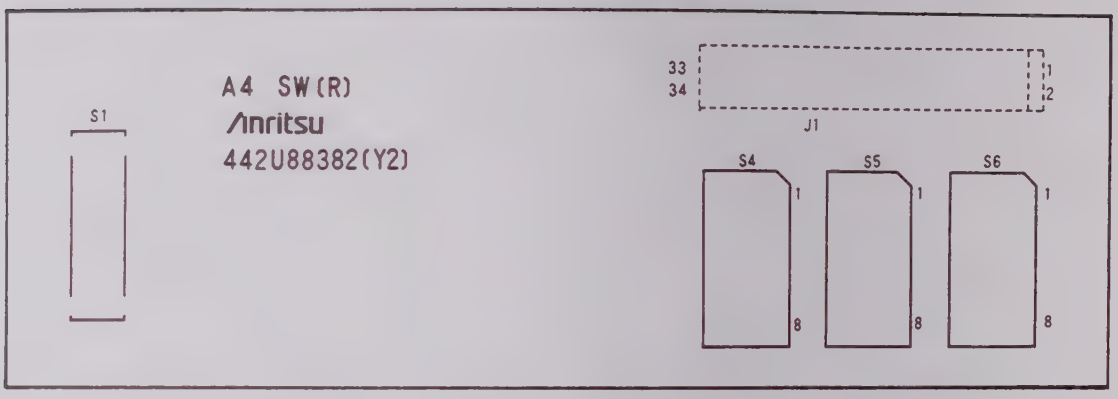
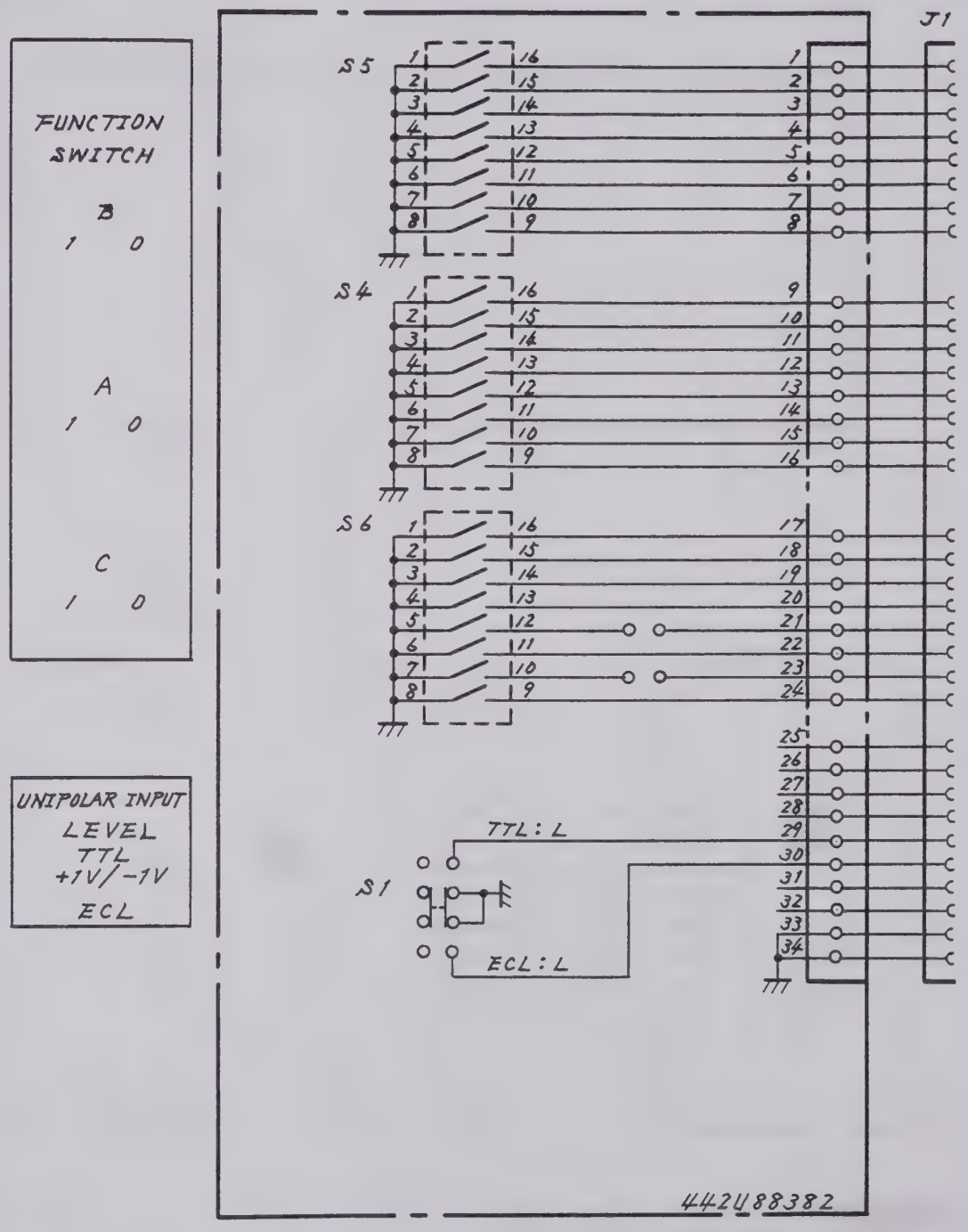


Fig. 3-115 R-SWITCH PC Board 15 Parts Layout

44W88393 1/1

APPLICATION

REVISIONS



Parts List 44W88394

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

15

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TITLE A4 R-SWITCH Circuit Diagram (Receiver)

DRAWING No. 44W88393 1/1

No. 0025-1985.08

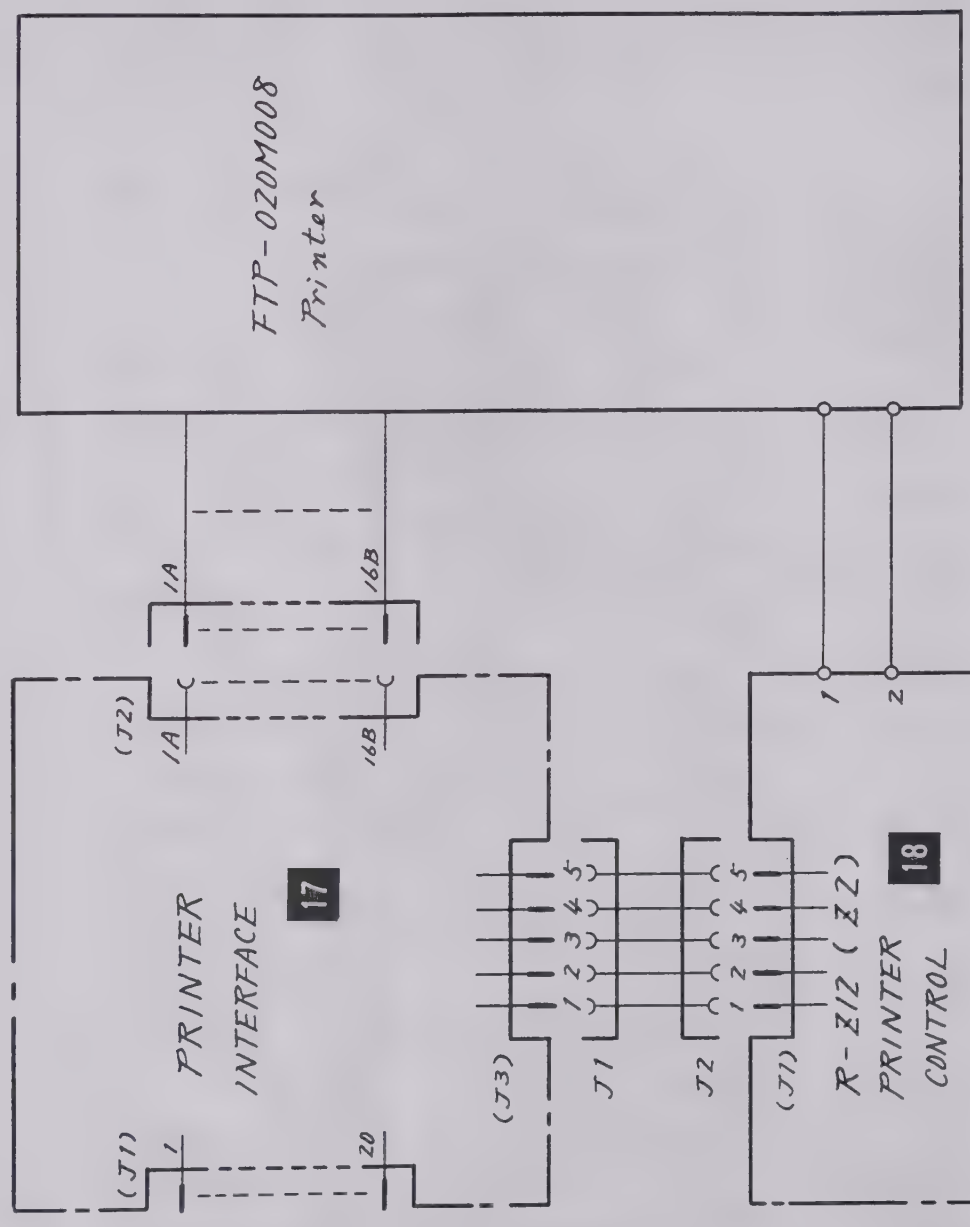
ANRITSU CORP.

3-209/3-210

4

APPLICATION

REVISIONS



Parts List 44W85802

16

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH	NOTE

CHECKED BY	TRACED BY	SCALE
APPROVED BY	DRAWN BY	

OEP

TITLE: A8 PRINTER UNIT

DRAWING No. 44W85803 1/1

No 0025-1985.03

ANRITSU CORP.

3-211

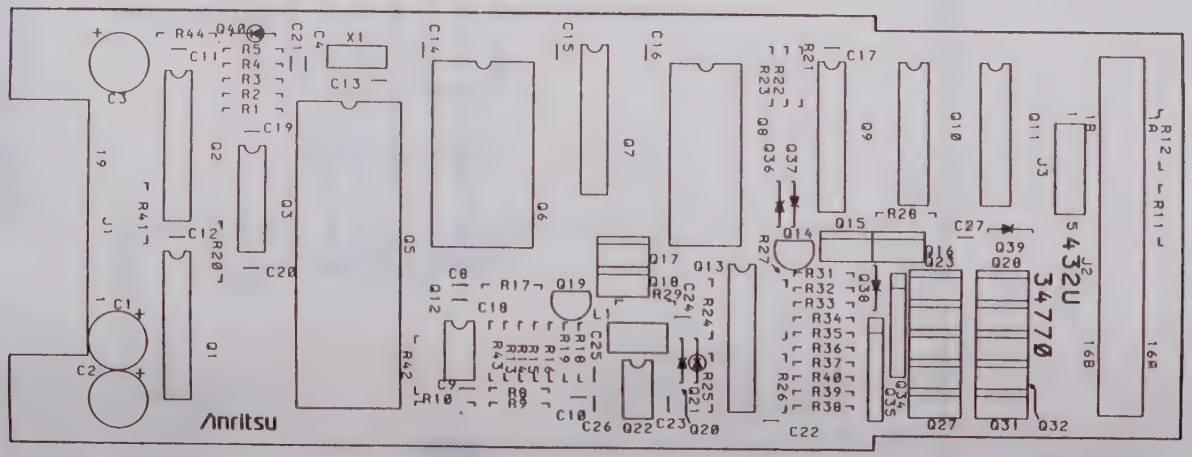


Fig. 3-116 Z1 in A8 PRINTER INTERFACE PC Board Parts Layout

43W34762 1/1

APPLICATION

REVISIONS

J1 DO D1 D2 D3 D4 D5 D6 D7

Q1 74ALS574

Q2 74ALS540

Q3 74LS74A

Q3 μPD8748D

Q5-35 HDIR21

Q6

Q7 74LS541

Q8 μPD8243C

Q9 74ALS574

Q10 MS4563P

Q11 MS4563P

Q12 μPC277C

Q13 74F537PC

+24V

+5V

RESET

BSY

ACK

PEND

PRINT

FEED

HEAD-UP

LED

PEND IN

PEND OT

TIM IN

TIM OT

INT

PROG

DB0 DB1 DB2 DB3 DB4 DB5 DB6 DB7

DD1 DD2 DD3 DD4 DD5 DD6 DD7 DD8

DS0 DS1 DS2

P10 P11 P12 P13 P14 P15 P16 P17

P20 P21 P22 P23 P24 P25 P26 P27

P40 P41 P42 P43 P70 P71 P72 P73

P60 P61 P62 P63 P50 P51 P52 P53

J2 S1 S2 S3 S4 S5 S6 S7

J3 1 PRINT 2 FEED 4 HEAD-UP 3 LED 5

432U34770

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY | TRACED BY | SCALE

APPROVED BY | DRAWN BY

M-1

TITLE: 21 in A8 PRINTER INTERFACE Circuit Diagram

DRAWING No. 43W34762 1/1

Parts List 44W85804

DEP

17

ANRITSU CORP.

3-213

No. 0023-1985.08

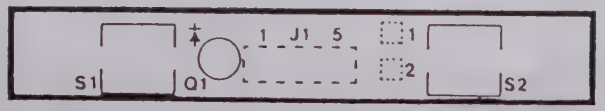


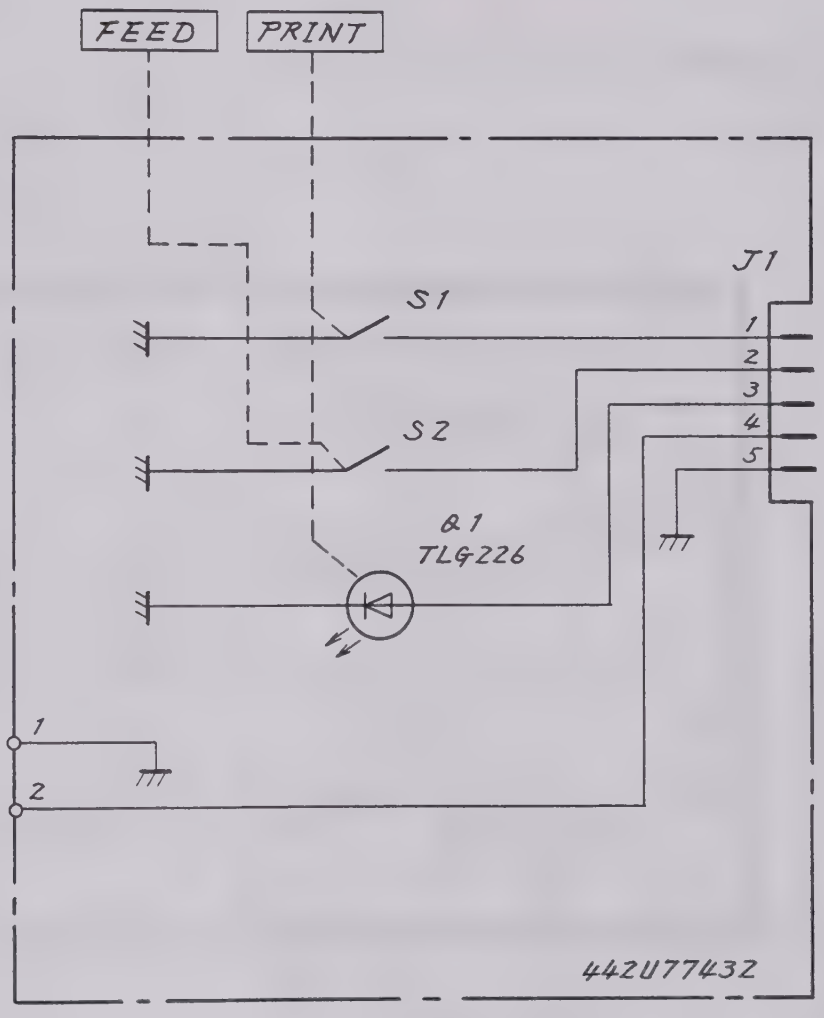
Fig. 3-117 Z2 in A8 PRINTER CONTROL PC Board Parts Layout

18

44W85806 1/1

APPLICATION

REVISIONS



Parts List 44W85805

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

18

CHECKED BY | TRACED BY | SCALE

APPROVED BY | DRAWN BY

DEP

TITLE ZZ in A8 PRINTER CONTROL

DRAWING No. 44W85806 1/1

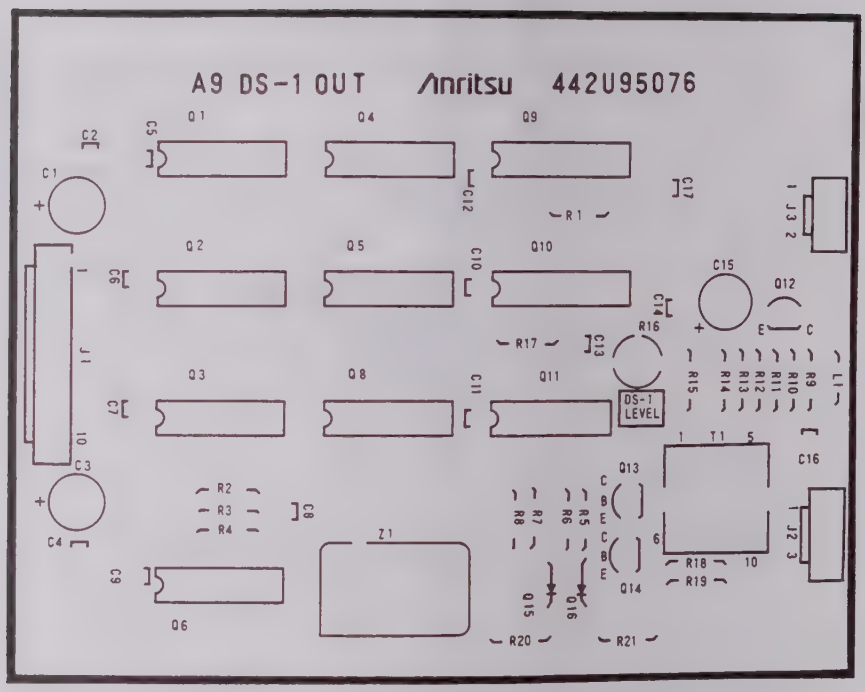


Fig. 3-118 A9 DS-1 OUTPUT PC Board Parts Layout

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APPLICATION

REVISIONS

J1
1 (DS-1DATA)
4 (DS-1CLK)
Q1 74HCT00P
Q2 74HC393
Q3 74HC74
Q1
+5V
+12
C1 330
C2 0.1
C5 0.1
C6 0.1
C7 0.1
C10 0.1
C11 0.1
C3 330
C4 0.1
R1 10k
C12 0.1
Q9 MSM6903AS
DI WCK RCK WR RR CS WI RI DO
Q10 XR-T5670CP
AMI/B8ZS
R17 10k
C13 0.1
Q11 74LS38
R8 1k
R7 390
R6 1k
R5 390
J3 B8ZS:H
+5VB
C9 0.1
R3 220k
C8 4700p
R2 1k
Z1 3.088MHz
Q8 74HC74
R4 1k
Q6 MC4044
VCXO
Q4 74HC393
Q5 74HC74
Q17 μPC14305H
+12V
+5VB
Q13 2SC2901
Q12 2SC2901
Q14 2SC2901
Q15 1S953
Q16 1S953
R10 1k
R9 330
C16 0.1
R15 680
R13 750
C15 330
C14 0.1
R14 680
R16 200
DS-1 LEVEL
R20 220
R18 10
R21 220
R19 10
T1
L1 47μH
R12 2.2k
R11 270
J2

442U95076

Parts List 44W95156

QTY	ITEM	PART No.	DESCRIPTION	MATERIAL	FINISH

CHECKED BY	DRAWN BY	SCALE	
APPROVED BY	DESIGNED BY	:	

TITLE A9 DS-1 OUTPUT Circuit Diagram (Receiver) (OPT 03)

DRAWING No. 43W39923 1/1

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DEP

ANRITSU CORP.

3-217/3-218

SECTION 4

REPLACEABLE PARTS

4.1 Introduction

This section describes how to order replacement parts or components. The following tables (Table 4-2 and 4-3) show circuit references (CKT REF) and abbreviations used for items in the Parts Lists. The quantity of each item in the Parts Lists. The quantity of each item in the Parts List is "one" unless another value is given in the "NOTE" column.

4.2 Ordering information

When ordering parts, please supply the following description from the PARTS LIST.

Table 4-1 Ordering Information

No.	Item	Example
1	Instrument name	ME3401A Transmitter, Digital Transmission Analyzer
2	Parts location	Parts of Z1 POWER SUPPLY
3	CKT REF	R1
4	Parts name	ARD25T 100J Note: The part name is given in parentheses ( ) in the Parts List. Parts with asterisk* require factory adjustment upon repair. When ordering part(s) marked with an asteirsk, give full description of the part(s).
5	Quantity	1
6	Instrument serial No.	M31257

4.3 Circuit References and Abbreviations used in the Parts List

(1) Circuit references

Table 4-2

A:	PC board	G:	Fan	M:	Meter, timer	S:	Switch
B:	Speaker	J:	Jack, plug, connector	P:	Lamp	T:	Transformer
C:	Capacitor	K:	Relay	Q:	Transistor, diode, IC, rectifier	W:	Cable
E:	Terminal	K:	Coil microinductor	R:	Resistor	X:	Crystal OSC
F:	Fuse					Z:	Miscellaneous

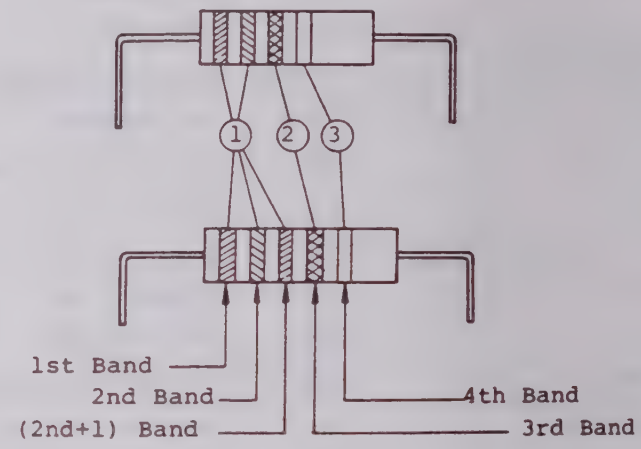
(2) Abbreviations

Table 4-3

A:	amperes	Multi:	multiplying
Att, R var:	variable attenuator using film elements	N-ch:	N-channel
		non-lin:	non-linear taper
BL:	boundary layer	Non-pol:	non polarity
Cer:	ceramic	NPN:	negative-positive-negative
CF:	carbon film	Ω:	ohms
Comp:	composition	p:	pico (x 10^{-12})
CRT:	cathode-ray tube	Plast:	plastic film
Di:	diode	PMTR:	potentiometer
DIP:	dual in-line package	PNP:	positive-negative-positive
Elect:	electrolytic aluminum	p-p:	peak-to-peak value
F:	farad	RFC:	RF choke
FET:	field-effect transistor	R-lamp:	resistor lamp
G:	ground	rms:	effective value (root-mean-square)
Ge:	germanium	SBD:	Schottky barrier diode
H:	henry	SCR:	silicon-controlled rectifier
Hz:	hertz	Si:	silicon
IC:	integrated circuit	SRD:	step-recovery diode
IEC:	Conforms to IEC Safety Standards	Tant:	tantalum
J-FET:	junction FET	TM:	time-lag
k:	kilo (x 10^{3})	Tr:	transistor
LED:	light-emitting diode	Trans:	transformer
M:	mega (x 10^{6})	μ:	micro (x 10^{-6})
m:	milli (x 10^{-3})	V:	volt
MF:	metallized film	Var:	variable
MOS-FET:	metal-oxide semiconductor FET	WW:	wire-wound
M paper:	metallized paper	XTAL:	crystal
M plast:	metallized plastic film		

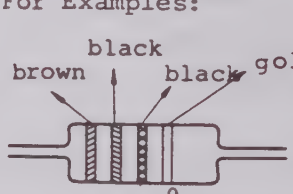
4.4 Reading Capacitance and Resistance

(1) Reading resistance



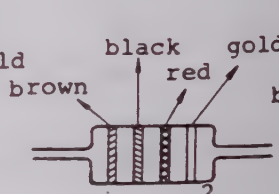
COLOR	① Figure		② Multiplier	③ Tolerance
	1st	2nd	3rd	4th
Black	0	0	$x10^0$	-
Brown	1	1	$x10^1$	-
Red	2	2	$x10^2$	-
Orange	3	3	$x10^3$	-
Yellow	4	4	$x10^4$	-
Green	5	5	$x10^5$	±0.5%
Blue	6	6	$x10^6$	-
Purple	7	7	$x10^7$	-
Gray	8	8	$x10^8$	-
White	9	9	$x10^9$	-
Gold	-	-	$x10^{-1}$	±5%
Silver	-	-	$x10^{-2}$	±10%
-----	-	-		±20%

For Examples:



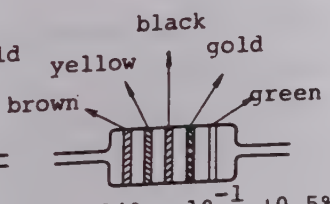
10×10^0 ±5%

10 Ω, ±5%



10×10^2 ±5%

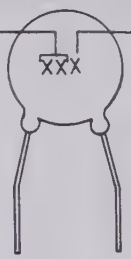
1 kΩ, ±5%



140×10^{-1} ±0.5%

14.0 Ω, ±0.5%

(3) Reading capacitance



Examples: 103 = 100,000 pF = 10^{-8} or 0.01 µF

302 = 3,000 pF = 3 x 10^{-9}F or 0.003 µF

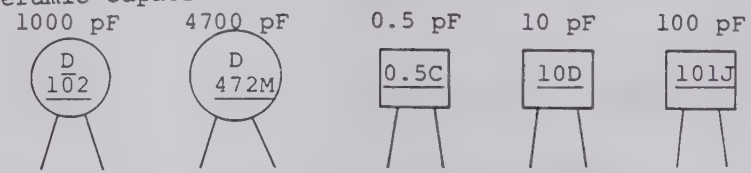
676 = 67,000,000 pF = 67 x 10^{-6}F or 67 µF

(a) Ceramic capacitors, polyester capacitors

Marking	0.5	1	10	101	102	103	104
Capacity	0.5 pF	1 pF	10 pF	100 pF	1000 pF	0.01 µF	0.1 µF

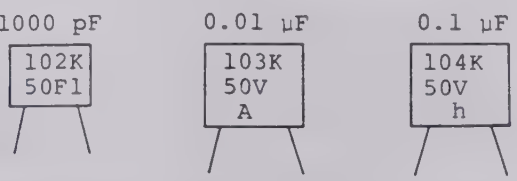
Examples:

Ceramic Capacitors



Capacity values are always underlined.

Polyester Capacitors



(b) Tantalum capacitors, Metallized capacitors and Electrolytic capacitors

Marking	OR47	010	100	101
Capacitor	0.47 µF	1 µF	10 µF	100 µF

4.5 Parts List

Note:

See Table 3-4 and Table 3-5 for a list of the circuit diagram names/numbers, Z numbers, PC board numbers, and parts list numbers.

Parts List: DIGITAL TRANSMISSION ANALYZER ME3401A TRANSMITTER 1

CKT REF	DESCRIPTION	RATING		NOTE
A 1	PATTERN GENERATOR (422U13832)			44W88385
A 2	T-CONTROL(422U13834)			44W88386
A 3	T-DISPLAY(422U13836)			44W88387
A 4	JITTER MODULATION (422U13913)			44W88388 OPT01
A 5	MODULATION SIGNAL GENERATOR(432U36046)			44W88408 OPT01
A 6	T-SWITCH(442U91223)			44W90993
A 7	GP-IB(442U83054)			44W83046 OPT41
A 8	RS-232C(442U83056)			44W83047 OPT43
E 1	Terminal,(44E87532)			
E 2	Terminal,(ML-9DE(2P))			
G 1	Fan,(FBK-08A12LZ)			
J 1	Jack,(DF1-15S2.5R24)			
J 2	Jack,(DF1-2S2.5R24)			
J 3	Jack,(DF1-2S2.5R24)			
J 4	Not assigned			
J 5	Jack,(U-SA1003)			
J 6	Jack,(DF1-15S2.5R24)			
J 7	Jack,(DF1-2S2.5R24)			
J 8	Not assigned			
J 9	Not assigned			
J 10	Not assigned			
J 11	Receptacle, (BNC-R-101-NI)			
J 12	Receptacle, (BNC-R-101-NI)			
J 13	Receptacle, (BNC-R-101-NI)			
J 14	Receptacle, (BNC-R-101-NI)			
J 15	Receptacle, (BNC-R-101-NI)			
J 16	Receptacle, (BNC-R-101-NI)			
J 17	Receptacle, (BNC-R-101-NI)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: DIGITAL TRANSMISSION ANALYZER ME3401A TRANSMITTER 1

CKT REF	DESCRIPTION	RATING		NOTE
J 18	Receptacle, (BNC-R-101-NI)			
J 19	Inlet,(NC-165)			
J 20	Jack,(DF1-8S2.5R24)			
J 21	Jack,(DF1-2S2.5R24)			
J 22	Jack,(DF1-2S2.5R24)			
J 23	Jack,(DF1-2S2.5R24)			
J 24	Jack,(DF1-2S2.5R24)			
J 25	Jack,(DF1-2S2.5R24)			
J 26	Jack,(DF1-2S2.5R24)			
S 1	Switch,(ESB-76)			
S 2	Switch,(8E3011)			
T 1	Power,(44T88342)	90VA		
W 1	Cable, (HIF3BA5B-34DAA26S)			
Z 1	Line filter, (MBW-1202-33)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A2 T-CONTROL (TRANSMITTER) 2

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Elect,(SME80LISS-1000050D)	10000μF,±20%,80V		
C 2	Elect,(CE04C1J100A)	10μF,±20%,63V		
C 3	Elect,(CE04C1V221A)	220μF,±20%,35V		
C 4	Elect,(CE04C1E470A)	47μF,±20%,25V		
C 5	Elect,(CE04C1V221A)	220μF,±20%,35V		
C 6	Elect,(SXE35VB-680 ϕ12.5 x 25)	680μF,±20%,35V		
C 7	Elect,(SXE25VB-1000 ϕ12.5 x 25)	1000μF,±20%,25V		
C 8	Elect,(SXE25VB-1000 ϕ12.5 x 25)	1000μF,±20%,25V		
C 9	Elect,(SXE16VB-1500 ϕ12.5 x 25)	1500μF,±20%,16V		
C 10	Elect,(SXE16VB-1500 ϕ12.5 x 25)	1500μF,±20%,16V		
C 11	Elect,(SXE16VB-1500 ϕ12.5 x 25)	1500μF,±20%,16V		
C 12	Not assigned			
C 13	Not assigned			
C 14	Elect,(CE04C1E221A)	220μF,±20%,25V		
C 15	Not assigned			
C 16	Plast,(ECQ-P1102FZ)	1000pF,±1%,100V		
C 17	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C 18	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 19	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 20	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 21	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 22	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 23	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 24	Not assigned			
C 25	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 26	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 27	Not assigned			
C 28	Not assigned			
C 29	Not assigned			
C 30	Elect,(CE04C1H2R2A)	2.2μF,±20%,50V		
C 31	Elect,(CE04C1H2R2A)	2.2μF,±20%,50V		
C 32	Elect,(CE04C1A102A)	1000μF,±20%,10V		
C 33	Elect,(CE04C1A101A)	100μF,±20%,10V		
C 34	Elect,(CE04C1E470A)	47μF,±20%,25V		
C 35	Elect,(CE04C1E470A)	47μF,±20%,25V		
C 36	Elect,(CE04C1A221A)	220μF,±20%,10V		
C 37	Elect,(CE04C1A221A)	220μF,±20%,10V		
C 38	Not assigned			
C 39	Not assigned			
C 40	Not assigned			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A2 T-CONTROL (TRANSMITTER) 2

CKT REF	DESCRIPTION	RATING		NOTE
C 41	Not assigned			
C 42	Not assigned			
C 43 to C 54	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 55	Elect,(CE04C1C331A)	330μF,±20%,16V		
C 56	Elect,(CE04C1C331A)	330μF,±20%,16V		
C 57	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C 58	Elect,(CE04C1J470A)	47μF,±20%,63V		
F 1	Fuse,(MF51NN250V5ADC01)	5A,250V		
F 2	Fuse, (MF51NN250V0.5ADC01)	0.5A,250V		
F 3	Fuse,(MF51NN250V1ADC01)	1A,250V		
F 4	Fuse,(MF51NN250V5ADC01)	5A,250V		
F 5	Fuse,(MF51NN250V2ADC01)	2A,250V		
J 1	Plug,(DF1-15P2.5DSA)	15pins		
J 2	Plug,(DF1-2P2.5DSA)	2pins		
J 3	Plug,(DF1-2P2.5DSA)	2pins		
J 4	Cable,(CNF23-16D-AA20S)			
J 5	Cable,(CNF23-20D-AA10S)			
J 6	Plug,(CNF3-34P-2.54DSA)	34pins		
J 7	Plug,(CNF3-34P-2.54DSA)	34pins		
J 8	Plug,(DF1-2P-2.5DSA)	2pins		
K 1	Relay,(OHD3-90M)			
L 1	Coil,(SK-17C-045-650)	650μH		
L 2	Coil,(SK-17C-045-650)	650μH		
L 3	Coil,(SK-21C-060-550)	550μH		
L 4	Coil,(SK-24S-110-100)	100μH		
L 5	Coil,(SK-24S-110-100)	100μH		
L 6	Coil,(SK-21C-080-140)	140μH		
M 1	Not assigned			
Q 1	IC,(μPC494C)			
Q 2	IC,(μPC1251C)			
Q 3	IC,(μPC393C)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A2 T-CONTROL (TRANSMITTER) 2

CKT REF	DESCRIPTION	RATING		NOTE
Q 4	Tr,(2SC3179)			
Q 5	Tr,(2SA1154)			
Q 6	Tr,(2SC3220)			
Q 7	Tr,(2SC3220)			
Q 8	Photo coupler,(PC618)			
Q 9	Photo coupler,(PC817X)			
Q 10	Not assigned			
Q 11	Rectifier, (D5FB20(4002))			
Q 12	Rectifier,(RB-152-LFB)			
Q 13	Rectifier,(V03G)			
Q 14	Rectifier,(V19E-1)			
Q 15	Rectifier,(V19E-1)			
Q 16	Rectifier,(V19E-1)			
Q 17	Rectifier,(V19E-1)			
Q 18	Rectifier,(V19E-1)			
Q 19	Rectifier,(V19E-1)			
Q 20	Rectifier,(D5LC20U-4000)			
Q 21	Rectifier,(D6LC20U-4000)			
Q 22	Rectifier,(D6LC20UR-4000)			
Q 23	Rectifier,(D10SC4M)			
Q 24	Rectifier,(D10SC4MR)			
Q 25	Not assigned			
Q 26	Not assigned			
Q 27	Not assigned			
Q 28	Di,breakdown,(RD5.1E)	4.8 to 5.37V,500mW		
Q 29	Di,breakdown,(RD13E)	12.11 to 13.66V,500mW		
Q 30	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW		
Q 31	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW		
Q 32	Di,(1S955)			
Q 33	Di,(1S955)			
Q 34	Di,(1S953)			
Q 35	Not assigned			
Q 36	Not assigned			
Q 37	Not assigned			
Q 38	Not assigned			
Q 39	Not assigned			
Q 40	Di,(1S953)			
Q 41	Di,(1S953)			
Q 42	Not assigned			
Q 43	Not assigned			
Q 44	Not assigned			
Q 45	IC,(74LS244)			
Q 46	IC,(74LS245)			
Q 47	IC,(74LS14)			
Q 48	IC,(74LS139)			
Q 49	IC,(74LS74)			

( ): Manufacturer's part number
• : Selected at factory

Parts List: A2 T-CONTROL (TRANSMITTER) 2

CKT REF	DESCRIPTION	RATING		NOTE
Q 50	IC,(74LS32)			
Q 51	IC,(74LS123)			
Q 52	IC,(74LS04)			
Q 53	IC,(74LS155)			
Q 54	IC,(MBJ771(DIP))			
Q 55	IC,(TC74HC00P)			
Q 56	IC,(EPROM32KX8-20C)			
Q 57	IC,(HM6264ALP-15)			
Q 58	IC,(uPD8259AC-2)			
Q 59	IC,(uPD780C-2)			
Q 60	IC,(7437)			
Q 61	IC,(74LS74)			
Q 62	IC,(74LS245)			
Q 63	IC,(uPD71055C-10)			
Q 64	IC,(74LS245)			
Q 65	IC,(74LS244)			
Q 66	IC,(uPC14312H)			
Q 67	IC,(uPC16312H)			
R 1	MF,(RS1FB4.7KΩJ)	4.7kΩ,±5%,1W		
R 2	MF,(RS1FB3.3KΩJ)	3.3kΩ,±5%,1W		
R 3	MF,(RS1FB3.3KΩJ)	3.3kΩ,±5%,1W		
R 4	MF,(RN14K2H101J)	100Ω,±5%,1/2W		
R 5	CF,(ARD25T123J)	12kΩ,±5%,1/4W		
R 6	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 7	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 8	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 9	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 10	CF,(RN14K2H470J)	47Ω,±5%,1/2W		
R 11	MF,(RN14K2H100J)	10Ω,±5%,1/2W		
R 12	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 13	MF,(RN14K2H470J)	47Ω,±5%,1/2W		
R 14	MF,(RN14K2H100J)	10Ω,±5%,1/2W		
R 15	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 16	MF,(RS2FB220ΩJ)	220Ω,±5%,2W		
R 17	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W		
R 18	CF,(ARD25T621J)	620Ω,±5%,1/4W		
R 19	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 20	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 21	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 22	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 23	MF,(RN14K2H102J)	1kΩ,±5%,1/2W		
R 24	MF,(RN14K2H102J)	1kΩ,±5%,1/2W		
R 25	MF,(RN14K2H101J)	100Ω,±5%,1/2W		
R 26	MF,(RN14K2H101J)	100Ω,±5%,1/2W		
R 27	Not assigned			

( ): Manufacturer's part number
• : Selected at factory

Parts List: A2 T-CONTROL (TRANSMITTER) 2

CKT REF	DESCRIPTION	RATING		NOTE
R 28	MF,(RS1FB3.3KΩJ)	3.3kΩ,±5%,1W		
R 29	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 30	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 31	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 32	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 33	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 34	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 35	Not assigned			
R 36	Not assigned			
R 37	Not assigned			
R 38	Not assigned			
R 39	Not assigned			
R 40	CM,var,(RJ-6P 200Ω)	200Ω,1/2W		
R 41	Not assigned			
R 42	Not assigned			
R 43	Not assigned			
R 44	Not assigned			
R 45	MF,(RN14K2E2741D)	2.74kΩ,±0.5%,1/4W		
R 46	MF,(RN14K2E1001D)	1kΩ,±0.5%,1/4W		
R 47	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 48	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 49	Not assigned			
R 50	SIP type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W		
R 51	SIP type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W		
R 52	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 53	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 54	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 55	MF,(ERF-2AK3R3)	3.3kΩ,±5%,2W		
R 56	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 57	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
T 1	Trans,(44T75381)			
T 2	Trans,(44T75381)			
T 3	Trans,(43YT3605I)			
Z 1	XTAL OSC,(TD308C)	8MHz		
Z 2	Battery,(BR-AE2SP)			

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V		
C 2	Cer,(CC45CH1H220JY)	22pF,±5%,50V		
C 3	Cer,(CC924CH1H560J)	56pF,±5%,50V		
C 4	Cer,(CC45CK1H010CY)	1pF,±0.25pF,50V		
C 5	Cer,(CC924CH1H151J)	150pF,±5%,50V		
C 6	Cer,(CC45CH1H330JY)	33pF,±5%,50V		
C 7	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C 8	Cer,(CC924CH1H151J)	150pF,±5%,50V		
C 9	Cer,(CC45CH1H330JY)	33pF,±5%,50V		
C 10	Cer,(CC924CH1H221J)	220pF,±5%,50V		
C 11	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C 12	Cer,(CC45CH1H220JY)	22pF,±5%,50V		
C 13	Cer,var,(TZ03R200A)	20pF,100V		
C 14	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C 15	Cer,var,(TZ03Z070A)	7pF,100V		
C 16	Cer,var,(TZ03R200A)	20pF,100V		
C 17	Cer,var,(TZ03R200A)	20pF,100V		
C 18	Not assigned			
C 19	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 20	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 21	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 22	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 23	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 24	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 25	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 26	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 27	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 28	Not assigned			
C 29 to C 40	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 41	Cer,(RPE111CH161G50)	160pF,±2%,50V		
C 42	Cer,(RPE111CH161G50)	160pF,±2%,50V		
C 43	Cer,(RPE111CH161G50)	160pF,±2%,50V		
C 44	Cer,(RPE111CH161G50)	160pF,±2%,50V		
C 45	Cer,(RPE111CH161G50)	160pF,±2%,50V		
C 46	Cer,(RPE111CH161G50)	160pF,±2%,50V		
C 47	Cer,(CC924CH1H510J)	51pF,±5%,50V		
C 48	Cer,(CC924CH1H510J)	51pF,±5%,50V		
C 49	Cer,(CC924CH1H510J)	51pF,±5%,50V		
C 50	Cer,(CC924CH1H510J)	51pF,±5%,50V		
C 51	Cer,(CC924CH1H510J)	51pF,±5%,50V		
C 52	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V		
C 53	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V		
C 54	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V		
C 55	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V		
C 56	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING		NOTE
C 57	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V		
C 58	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V		
C 59	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 60	Plast,(ECQ-P1102FZ)	1000pF,±1%,100V		
C 61	Plast,(ECQ-P1102FZ)	1000pF,±1%,100V		
C 62	Plast,(ECQ-P1152FZ)	1500pF,±1%,100V		
C 63	Plast,(ECQ-P1152FZ)	1500pF,±1%,100V		
C 64	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 65	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 66	Not assigned			
C 67	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 68	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 69	Not assigned			
C 70	Not assigned			
C 71 to C 81	Elect,(CE04C1E101A)	100μF,±20%,25V		
C 82	Not assigned			
C 83	Not assigned			
C 84	Not assigned			
C 85 to C 96	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 97	Not assigned			
C 98	Not assigned			
C 99	Not assigned			
C100	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C101	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C102	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C103	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C104	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C105	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C106	Cer,(RPE111CH161G50)	160pF,±2%,50V		
C107	Cer,(CC924CH1H510J)	51pF,±5%,50V		
C108	Cer,(CC45CK1H020CY)	2pF,±0.25pF,50V		
C109	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C110	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C111	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C112	Cer,(CK924C1H103M)	0.01μF,±20%,50V		
C113	Cer,(CC924CH1H102J)	1000pF,±5%,50V		
C114	Cer,(CC924CH1H560J)	56pF,±5%,50V		
C115	Cer,(CC924CH1H560J)	56pF,±5%,50V		
C116	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C117	Cer,(CC924CH1H101J)	100pF,±5%,50V		
J 1	Cable,(CNF23-34D-AA20S)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING		NOTE
J 2	Plug,(U-PA1021)			
J 3	Plug,(DF1-15P2.5DSA)	15pins		
J 4	Plug,(CNF3-26P-2.54DS)	26pins		
J 5	Receptacle,(BNC-R-NI)			
J 6	Receptacle,(BNC-R-NI)			
J 7	Receptacle,(JACK238)			
J 8	Receptacle,(BNC-R-NI)			
J 9	Receptacle,(BNC-R-NI)			
J 10	Receptacle,(BNC-R-NI)			
J 11	Receptacle,(BNC-R-NI)			
J 12	Receptacle,(BNC-R-NI)			
J 13	Receptacle,(BNC-R-NI)			
J 14	Plug,(DF1-5P2.5DSA)	5pins		
J 15	Plug,(DF1-2P2.5DSA)	2pins		
K 1 to K 23	Relay,(SVR-5V)			
L 1	Coil,(SP0408-1R5K)	1.5μH,±10%		
L 2	Coil,(10K17-85T)	0.358μH		
L 3	Coil,(439T23535)	0.89μH		
L 4	Coil,(439T23535)	0.89μH		
L 5	Coil,(439T23535)	0.89μH		
L 6	Coil,(439T23535)	0.89μH		
L 7	Coil,(439T23535)	0.89μH		
L 8	Coil,(439T23535)	0.89μH		
L 9	Coil,(442T77577)	0.3μH		
L 10	Coil,(442T77577)	0.3μH		
L 11	Coil,(442T77577)	0.3μH		
L 12	Coil,(442T77577)	0.3μH		
L 13	Coil,(442T77577)	0.3μH		
L 14	Coil,(442T77577)	0.3μH		
L 15	Coil,(LF8-470K)	47μH,±10%		
L 16	Coil,(SP0408-3R3)	3.3μH		
L 17	Coil,(SP0408-3R3)	3.3μH		
L 18	Coil,(33T20196E)	4.7μH		
L 19	Coil,(33T20196E)	4.7μH		
L 20	Coil,(439T23535)	0.89μH		
L 21	Coil,(442T77577)	0.3μH		
Q 1 to Q 24	Di,breakdown,(RD3.9E)	3.7 to 4.16V,500mW		

( ): Manufacturer's part number
* : Selected at factory

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Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING		NOTE
Q 25	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW		
Q 26	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW		
Q 27	Di,(1S953)			
Q 28	Not assigned			
Q 29	Di,(1S953)			
Q 30	Di,(1S953)			
Q 31	Di,(1S953)			
Q 32	Di,(1S953)			
Q 33	Not assigned			
Q 34	Di,(1S953)			
Q 35	Not assigned			
Q 36	Tr,(2SC1907)			
Q 37	Tr,(2SC1907)			
Q 38	Tr,(2SC1907)			
Q 39	Not assigned			
Q 40 to Q 89	Tr,(2SC1907)			
Q 90	Tr,(2SC2901)			
Q 91	Tr,(2SC2901)			
Q 92	Tr,(2SC2901)			
Q 93	Tr,(2SC2570)			
Q 94	Tr,(2SC2570)			
Q 95	Tr,(2SC2570)			
Q 96	Tr,(2SC2570)			
Q 97	Tr,(2SA1206)			
Q 98	Tr,(2SA1206)			
Q 99	Di,(1S953)			
Q100	Di,(1S953)			
Q101	IC,(AB109CSP)			
Q102	IC,(10124)			
Q103	IC,(74F74)			
Q104	Not assigned			
Q105	IC,(uPD8253C-2)			
Q106	IC,(74LS04)			
Q107	IC,(10101)			
Q108	IC,(10116)			
Q109	IC,(10101)			
Q110	IC,(10101)			
Q111	IC,(10124)			
Q112	IC,(TD62003P)			
Q113	Not assigned			
Q114	IC,(74LS38)			
Q115	Not assigned			
Q116	Not assigned			
Q117	IC,(uPD8255AC-2)			
Q118	IC,(10124)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING		NOTE
Q119	IC,(74F174)			
Q120	IC,(10124)			
Q121	IC,(74F174)			
Q122	IC,(10124)			
Q123	IC,(74S04)			
Q124	IC,(74S04)			
Q125	IC,(74S00)			
Q126	IC,(74S64)			
Q127	IC,(74LS04)			
Q128	Not assigned			
Q129	Not assigned			
Q130	IC,(74LS74)			
Q131	Not assigned			
Q132	IC,(74LS03)			
Q133	IC,(10125)			
Q134	IC,(74S00)			
Q135	IC,(74F74)			
Q136	IC,(10125)			
Q137	IC,(10125)			
Q138	IC,(HD7400P)			
Q139	IC,(HD7400P)			
Q140	IC,(10116)			
Q141	IC,(74S00)			
Q142	IC,(74S00)			
Q143	IC,(74LS04)			
Q144	IC,(74LS86)			
Q145	IC,(74LS32)			
Q146	IC,(74LS139)			
Q147	IC,(74LS153)			
Q148	IC,(74LS175)			
Q149	IC,(74LS74)			
Q150	IC,(74LS54)			
Q151	IC,(74LS08)			
Q152	IC,(TD62003P)			
Q153	IC,(74LS123)			
Q154	Not assigned			
Q155	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW		
Q156	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW		
Q157	Di,(1S953)			
Q158	Di,(1S953)			
Q159	Di,(1S953)			
Q160	Di,(1S953)			
Q161	Di,breakdown,(RD3.6E)	3.4 to 3.845V,500mW		
Q162	Di,(1S953)			
Q163	Di,(1S953)			
Q164	Di,(1S953)			
Q165	Di,(1S953)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
Q166	Di,breakdown,(RD3.6E)	3.4 to 3.845V,500mW	
Q167	Di,(1S953)		
Q168	Di,(1S953)		
Q169	Di,(1S953)		
Q170	Di,(1S953)		
Q171	Di,(1S953)		
Q172	Di,(1S953)		
R 1	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 2	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 3	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 4	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 5	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R 6	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R 7	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 8	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 9	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 10	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 11	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 12	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 13	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 14	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 15	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 16	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 17	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R 18	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 19	Not assigned		
R 20	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R 21	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R 22	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R 23	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R 24	Not assigned		
R 25	Not assigned		
R 26	Not assigned		
R 27	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 28	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 29	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R 30	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 31	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 32	Not assigned		
R 33	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R 34	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 35	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 36	CF,(ARD25T220J)	22Ω,±5%,1/4W	
R 37	Not assigned		
R 38	Not assigned		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R 39	Not assigned		
R 40	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R 41	Not assigned		
R 42	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R 43	Not assigned		
R 44	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R 45	CM,var,(RJ-6P 2KΩ)	2kΩ,1/2W	
R 46	CM,var,(RJ-6P 2KΩ)	2kΩ,1/2W	
R 47	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 48	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 49	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 50	Not assigned		
R 51	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 52	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 53	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 54	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 55	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R 56	CF,(ERD10TJ471A)	470Ω,±5%,1/8W	
R 57	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 58	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R 59	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 60	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 61	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 62	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 63	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R 64	CF,(ERD10TJ*A)	330 to 820Ω,±5%,1/8W	*510Ω
R 65	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 66	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R 67	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 68	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 69	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 70	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 71	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 72	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R 73	CF,(ERD10TJ471A)	470Ω,±5%,1/8W	
R 74	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 75	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R 76	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 77	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 78	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 79	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 80	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R 81	CF,(ERD10TJ*A)	330 to 820Ω,±5%,1/8W	*510Ω
R 82	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 83	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R 84	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 85	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R 86	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 87	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 88	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 89	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R 90	CF,(ERD10TJ471A)	470Ω,±5%,1/8W	
R 91	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 92	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R 93	CF,(ERD25T221A)	220Ω,±5%,1/8W	
R 94	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R 95	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 96	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R 97	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R 98	CF,(ERD10TJ*A)	330 to 820Ω,±5%,1/8W	*510Ω
R 99	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R100	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R101	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R102	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R103	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R104	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R105	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R106	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R107	CF,(ERD10TJ471A)	470Ω,±5%,1/8W	
R108	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R109	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R110	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R111	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R112	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R113	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R114	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R115	CF,(ERD10TJ*A)	330 to 820Ω,±5%,1/8W	*470Ω
R116	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R117	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R118	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R119	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R120	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R121	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R122	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R123	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R124	CF,(ERD10TJ471A)	470Ω,±5%,1/8W	
R125	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R126	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R127	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R128	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R129	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R130	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R131	CF,(ARD25T561J)	560Ω,±5%,1/4W	
R132	CF,(ERD10TJ*A)	330 to 820Ω,±5%,1/8W	*470Ω

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R133	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R134	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R135	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R136	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R137	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R138	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R139	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R140	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R141	CF,(ERD10TJ471A)	470Ω,±5%,1/8W	
R142	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R143	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R144	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R145	CF,(ERD10TJ221A)	220Ω,±5%,1/8W	
R146	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R147	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R148	CF,(ERD10TJ561A)	560Ω,±5%,1/8W	
R149	CF,(ERD10TJ*A)	330 to 820Ω,±5%,1/8W	*470Ω
R150	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R151	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R152	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R153	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R154	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R155	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R156	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R157	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R158	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R159	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R160	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R161	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R162	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R163	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R164	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R165	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R166	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R167	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R168	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R169	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R170	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R171	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R172	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R173	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R174	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R175	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R176	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R177	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R178	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R179	CF,(ARD25T750J)	75Ω,±5%,1/4W	

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R180	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R181	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R182	CF,(ARD25T75J)	75Ω,±5%,1/4W	
R183	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R184	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R185	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R186	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R187	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R188	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R189	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R190	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R191	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R192	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R193	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R194	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R195	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R196	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R197	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R198	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R199	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R200	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R201	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R202	MF,(RN14K2E1740D)	174Ω,±0.5%,1/4W	
R203	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R204	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R205	MF,(RN14K2E1740D)	174Ω,±0.5%,1/4W	
R206	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R207	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R208	MF,(RN14K2E1740D)	174Ω,±0.5%,1/4W	
R209	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R210	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R211	MF,(RN14K2E1740D)	174Ω,±0.5%,1/4W	
R212	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R213	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R214	MF,(RN14K2E1740D)	174Ω,±0.5%,1/4W	
R215	MF,(RN14K2E1130D)	113Ω,±0.5%,1/4W	
R216	Not assigned		
R217	Not assigned		
R218	Not assigned		
R219	Not assigned		
R220	Not assigned		
R221	Not assigned		
R222	Not assigned		
R223	Not assigned		
R224	Not assigned		
R225	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R226	CF,(ARD25T391J)	390Ω,±5%,1/4W	

( ): Manufacturer s part number
* : Selected at factory

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Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R227	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R228	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R229	CF,(ARD25T100J)	10Ω,±5%,1/4W	
R230	CF,(ARD25T100J)	10Ω,±5%,1/4W	
R231	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R232	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R233	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R234	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R235	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R236	CF,(ARD25T751J)	750Ω,±5%,1/4W	
R237	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R238	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R239	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R240	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R241	CF,(ARD25T330J)	33Ω,±5%,1/4W	
R242	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R243	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R244	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R245	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R246	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R247	CF,(ARD25T330J)	33Ω,±5%,1/4W	
R248	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R249	CF,(ARD25T560J)	56Ω,±5%,1/4W	
R250	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R251	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W	
R252	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W	
R253	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R254	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R255	MF,(RN14K2E1780D)	178Ω,±0.5%,1/4W	
R256	Not assigned		
R257	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R258	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R259	CF,(ARD25T820J)	82Ω,±5%,1/4W	
R260	CF,(ARD25T131J)	130Ω,±5%,1/4W	
R261	Not assigned		
R262	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R263	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R264	Not assigned		
R265	Not assigned		
R266	MF,(RN14K2E1780D)	178Ω,±0.5%,1/4W	
R267	Not assigned		
R268	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R269	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R270	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R271	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R272	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R273	CF,(ARD25T391J)	390Ω,±5%,1/4W	

( ): Manufacturer's part number
* : Selected at factory

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Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R274	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R275	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R276	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R277	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R278	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R279	Not assigned		
R280	Not assigned		
R281 to R292	CM,var,(RJ-6P 100Ω)	100Ω,1/2W	
R293	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R294	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R295	CM,var,(RJ-6P 100Ω)	100Ω,1/2W	
R296	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R297	Not assigned		
R298	CM,var,(RJ-6P 100Ω)	100Ω,1/2W	
R299	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R300	Not assigned		
R301	CM,var,(RJ-6P 100Ω)	100Ω,1/2W	
R302	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R303	Not assigned		
R304	CM,var,(RJ-6P 100Ω)	100Ω,1/2W	
R305	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R306	Not assigned		
R307	Not assigned		
R308	Not assigned		
R309	Not assigned		
R310	Not assigned		
R311	SIP type,(RRS-8-472JA)	4.7kΩ x 8,±5%,1/8W	
R312	SIP type,(RRS-4-103JA)	10kΩ x 4,±5%,1/8W	
R313	SIP type,(RRS-6-102JA)	1kΩ x 6,±5%,1/8W	
R314	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R315	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R316	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R317	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R318	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R319	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R320	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R321	SIP type,(RRS-6-471JA)	470Ω x 6,±5%,1/8W	
R322	SIP type,(RRS-6-471JA)	470Ω x 6,±5%,1/8W	
R323	SIP type,(RRS-6-471JA)	470Ω x 6,±5%,1/8W	
R324	Not assigned		
R325	CF,(ARD25T301J)	300Ω,±5%,1/4W	
R326	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R327	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R328	CM,var,(RJ-6P 2KΩ)	2kΩ,1/2W	
R329	CF,(ARD25T102J)	1kΩ,±5%,1/4W	

( ): Manufacturer's part number
* : Selected at factory

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Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING	NOTE
R330	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R331	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R332	CF,(ARD25T301J)	300Ω,±5%,1/4W	
R333	CF,(ARD25T101J)	100Ω,±5%,1/4W	
R334	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R335	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R336	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R337	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R338	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R339	Not assigned		
R340	Not assigned		
R341	CF,(ARD25T181J)	180Ω,±5%,1/4W	
R342	CF,(ARD25T111J)	110Ω,±5%,1/4W	
R343	CF,(ARD25T181J)	180Ω,±5%,1/4W	
R344	CF,(ARD25T111J)	110Ω,±5%,1/4W	
R345	Not assigned		
R346	Not assigned		
R347	Not assigned		
R348	Not assigned		
R349	Not assigned		
R350	Not assigned		
R351	CF,(ARD25T6R8J)	6.8Ω,±5%,1/4W	
R352	MF,(RN14K2E41R2D)	41.2Ω,±0.5%,1/4W	
R353	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R354	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R355	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R356	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R357	MF,(RN14K2E1370D)	137Ω,±0.5%,1/4W	
R358	MF,(RN14K2E8250D)	825Ω,±0.5%,1/4W	
R359	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R360	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R361	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R362	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R363	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R364	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R365	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W	
R366	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R367	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R368	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R369	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R370	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R371	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R372	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R373	CF,(ARD25T333J)	33kΩ,±5%,1/4W	
R374	Not assigned		
R375	Not assigned		
R376	Not assigned		

( ): Manufacturer's part number
* : Selected at factory

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Parts List: A1 PATTERN GENERATOR (TRANSMITTER) 3

CKT REF	DESCRIPTION	RATING		NOTE
R377	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R378	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R379	CF,(ARD25T150J)	15Ω,±5%,1/4W		
R380	CF,(ARD25T150J)	15Ω,±5%,1/4W		
R381	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R382	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R383	Not assigned			
R384	Not assigned			
R385	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R386	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R387	CM,var,(RJ-6P 5KΩ)	5kΩ,1/2W		
R388	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R389	Not assigned			
R390 to R401	CM,var,(RG04B202H)	2kΩ,1/4W		
S 1	DIP,(S1D-0401)			
T 1	Trans,(439T23519)			
X 1	XTAL,(44X80043)	44.736MHz		
X 2	XTAL,(44X68612C)	12.624MHz		
X 3	XTAL,(44X68612E)	12.608MHz		
X 4	XTAL,(44X68612A)	6.176MHz		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A3 T-DISPLAY (TRANSMITTER) 4

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Elect,(KME10T-220M)	220μF,±20%,10V		
C 2	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 3	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C 4	Elect,(KME10T-220M)	220μF,±20%,10V		
C 5	Elect,(KME10T-220M)	220μF,±20%,10V		
J 1	Plug,(CNF3-20P-2.54DSA)	20pins		
Q 1	IC,(μPD8279C-2)			
Q 2	IC,(74LS139)			
Q 3	IC,(74HC238)			
Q 4	IC,(TD62381P)			
Q 5	IC,(TD62785AP)			
Q 6	IC,(74HC238P)			
Q 7	IC,(TD62381P)			
Q 8	IC,(74HC00)			
Q 9	Not assigned			
Q 10	LED,(LN442YPH)			
Q 11 to Q 41	LED,(TLG209)			
Q 42	LED,(LT-9200N)			
Q 43	LED,(LT-9200N)			
Q 44	Not assigned			
Q 45	Not assigned			
Q 46	Not assigned			
Q 47	Not assigned			
Q 48	Not assigned			
Q 49	Not assigned			
Q 50	IC,(LN513GK)			
Q 51	IC,(LN513GK)			
Q 52	IC,(LN513GK)			
Q 53	IC,(LN513GK)			
Q 54	IC,(LN513GK)			
Q 55	IC,(LN513GK)			
Q 56	IC,(LN513GK)			
Q 57	IC,(LN513GK)			
R 1	SIP type,(RRS-4-330JB)	33Ω x 4,±5%,1/8W		
R 2	SIP type,(RRS-4-330JB)	33Ω x 4,±5%,1/8W		
R 3	SIP type,(RRS-6-223JB)	22kΩ x 6,±5%,1/8W		
R 4	SIP type,(RRS-4-223JA)	22kΩ x 4,±5%,1/8W		
R 5	SIP type,(RRS-4-330JB)	33Ω x 4,±5%,1/8W		
R 6	SIP type,(RRS-4-330JB)	33Ω x 4,±5%,1/8W		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A3 T-DISPLAY (TRANSMITTER) 4

CKT REF	DESCRIPTION	RATING		NOTE
R 7	SIP type,(RRS-4-330JB)	33Ω x 4,±5%,1/8W		
S 1 to S 19	Switch,(TM1-01)			

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Cer,(CC45CH1H151JY)	150pF,±5%,50V		
C 2	Cer,(CC45CH1H101JY)	100pF,±5%,50V		
C 3	Cer,(CC45CH1H100DY)	10pF,±0.25%,50V		
C 4	Cer,(CC924CH1H681J)	680pF,±5%,50V		
C 5	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C 6	Cer,(CC924CH1H101J)	100pF,±5%,50V		
C 7	Plast,(ECQ-P1132FZ)	1300pF,±1%,100V		
C 8	Plast,(ECQ-P1102FZ)	1000pF,±1%,100V		
C 9	Cer,(RPE111CH201G50)	200pF,±2%,50V		
C 10	Plast,(ECQ-P1272FZ)	2700pF,±1%,100V		
C 11	Plast,(ECQ-P1202FZ)	2000pF,±1%,100V		
C 12	Cer,(CC924CH1H391J)	390pF,±5%,50V		
C 13	Cer,(CC45CH1H151JY)	150pF,±5%,50V		
C 14	Cer,(CC45CH1H101JY)	100pF,±5%,50V		
C 15	Cer,(CC45CH1H100DY)	10pF,±0.25%,50V		
C 16	Cer,(CC924CH1H821J)	820pF,±5%,50V		
C 17	Cer,(CC924CH1H621J)	620pF,±5%,50V		
C 18	Cer,(CC924CH1H101J)	100pF,±5%,50V		
C 19	Plast,(ECQ-P1132FZ)	1300pF,±1%,100V		
C 20	Plast,(ECQ-P1102FZ)	1000pF,±1%,100V		
C 21	Cer,(RPE111CH201G50)	200pF,±2%,50V		
C 22	Plast,(ECQ-P1272FZ)	2700pF,±1%,100V		
C 23	Plast,(ECQ-P1202FZ)	2000pF,±1%,100V		
C 24	Cer,(CC924CH1H391J)	390pF,±5%,50V		
C 25	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V		
C 26	Cer,(CC924CH1H271J)	270pF,±5%,50V		
C 27	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C 28	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C 29	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C 30	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V		
C 31	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V		
C 32	Cer,(CC45CH1H470JY)	47pF,±5%,50V		
C 33	Cer,(CC45CH1H101JY)	100pF,±5%,50V		
C 34	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V		
C 35	Not assigned			
C 36	Elect,(CE04C1C331A)	330μF,±20%,16V		
C 37	Elect,(CE04C1C331A)	330μF,±20%,16V		
C 38	Elect,(CE04C1C331A)	330μF,±20%,16V		
C 39	Elect,(CE04C1C331A)	330μF,±20%,16V		
C 40	Elect,(CE04C1H2R2A)	2.2μF,±20%,50V		
C 41	Elect,(CE04C1E470A)	47μF,±20%,25V		
C 42	Elect,(CE04C1E470A)	47μF,±20%,25V		
C 43	Elect,(CE04C1C331A)	330μF,±20%,16V		
C 44	Elect,(CE04C1C331A)	330μF,±20%,16V		
C 45	Elect,(CE04C1C331A)	330μF,±20%,16V		
C 46	Not assigned			
C 47	Not assigned			

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING		NOTE
C 48	Not assigned			
C 49	Not assigned			
C 50	Plast,(ECQ-V1H684JW)	0.68μF,±5%,50V		
C 51 to C 72	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 73	Not assigned			
C 74 to C 89	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 90	Not assigned			
C 91	Not assigned			
C 92	Not assigned			
C 93	Not assigned			
C 94 to C104	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C105	Not assigned			
C106	Not assigned			
C107	Not assigned			
C108	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C109	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C110	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C111	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C112	Cer,(CC45CH1H100DY)	10pF,±0.5%,50V		
C113	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V		
C114	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C115	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C116	Elect,(CE04C1C331A)	330μF,±20%,16V		
C117	Elect,(CE04C1C331A)	330μF,±20%,16V		
C118	Cer,(CC45CH1H101JY)	100pF,±5%,50V		
J 1	Plug,(CNF23-26D-AA10S)			
J 2	Cable,(CNF23-16D-AA50S)			
J 3	Plug,(DF1-2P2.5DSA)	2pins		
J 4	Not assigned			
J 5	Jack,(DF1-5S2.5R24)			
J 6	Plug,(DF1-2P2.5DSA)			
J 7	Plug,(DF1-2P2.5DSA)			
J 8	Plug,(DF1-2P2.5DSA)			
K 1	Not assigned			
K 2	Relay,(SVR-5V)			
K 3	Relay,(SVR-5V)			
K 4	Relay,(SVR-5V)			
K 5	Relay,(SVR-5V)			

( ): Manufacturer's part number
• : Selected at factory

Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING		NOTE
K 6	Relay,(SVR-5V)			
L 1	Coil,(LF8-121K)	120μH,±10%		
L 2	Coil,(LF8-121K)	120μH,±10%		
L 3	Coil,(LF8-560K)	56μH,±10%		
L 4	Coil,(LF8-681K)	680μH,±10%		
L 5	Coil,(LF8-681K)	680μH,±10%		
L 6	Coil,(LF8-331K)	330μH,±10%		
L 7	Coil,(LH1-102K)	1.0mH,±10%		
L 8	Coil,(LH1-102K)	1.0mH,±10%		
L 9	Coil,(LF8-561K)	560μH,±10%		
L 10	Coil,(LH1-222K)	2.2mH,±10%		
L 11	Coil,(LH1-222K)	2.2mH,±10%		
L 12	Coil,(LH1-102K)	1.0mH,±10%		
L 13	Coil,(LF8-121K)	120μH,±10%		
L 14	Coil,(LF8-121K)	120μH,±10%		
L 15	Coil,(LF8-560K)	56μH,±10%		
L 16	Coil,(LF8-681K)	680μH,±10%		
L 17	Coil,(LF8-681K)	680μH,±10%		
L 18	Coil,(LF8-331K)	330μH,±10%		
L 19	Coil,(LH1-102K)	1.0mH,±10%		
L 20	Coil,(LH1-102K)	1.0mH,±10%		
L 21	Coil,(LF8-561K)	560μH,±10%		
L 22	Coil,(LH1-222K)	2200μH,±10%		
L 23	Coil,(LH1-222K)	2200μH,±10%		
L 24	Coil,(LH1-102K)	1.0mH,±10%		
L 25	Coil,(10K13M-65)	0.31μH		
L 26	Coil,(339T20197E)	15μH,±3%		
L 27	Coil,(339T20198D)	56μH,±3%		
L 28	Coil,(339T20199C)	220μH,±3%		
Q 1	Di,(1S953)			
Q 2	Di,breakdown,(RD3.9E)	3.7 to 4.16V,500mW		
Q 3	Di,vari-cap,(FC52M)			
Q 4	Di,vari-cap,(FC52M)			
Q 5	Di,vari-cap,(FC52M)			
Q 6	Di,vari-cap,(FC52M)			
Q 7	Di,vari-cap,(FC52M)			
Q 8	Di,vari-cap,(FC52M)			
Q 9	Di,vari-cap,(FC52M)			
Q 10	Di,breakdown,(1SZ52)	5.9 to 6.5V,250mW		
Q 11	Tr,(2SA836)			
Q 12	Tr,(2SA836)			
Q 13	Tr,(2SA836)			
Q 14	Tr,(2SA836)			

( ): Manufacturer's part number
• : Selected at factory

Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING		NOTE
Q 15	Tr,(2SC1907)			
Q 16	Tr,(2SC1907)			
Q 17	IC,(NJU201AD)			
Q 18	IC,(HA3-2525-5)			
Q 19	IC,(NJU201AD)			
Q 20	IC,(HA3-2525-5)			
Q 21	IC,(μPC151C)			
Q 22	IC,(μPC271C)			
Q 23	IC,(μPC1630SH)			
Q 24	IC,(HA3-2525-5)			
Q 25	Di,vari-cap,(FC52M)			
Q 26	Not assigned			
Q 27	Not assigned			
Q 28	Not assigned			
Q 29	Not assigned			
Q 30	IC,(74LS86)			
Q 31	IC,(74LS191)			
Q 32	IC,(74LS123)			
Q 33	IC,(74LS20)			
Q 34	IC,(74LS191)			
Q 35	IC,(74LS74)			
Q 36	IC,(74LS08)			
Q 37	IC,(74LS14)			
Q 38	IC,(74LS191)			
Q 39	IC,(74LS04)			
Q 40	Not assigned			
Q 41	IC,(74LS74)			
Q 42	IC,(TD6200JP)			
Q 43	IC,(10124)			
Q 44	IC,(HA17012PC)			
Q 45	IC,(MC1648P)			
Q 46	IC,(MC1648P)			
Q 47	IC,(MC1648P)			
Q 48	IC,(MC1648P)			
Q 49	Not assigned			
Q 50	Not assigned			
Q 51	IC,(MC10115L)			
Q 52	IC,(10102)			
Q 53	IC,(μPC177C)			
Q 54	IC,(10101)			
Q 55	IC,(HD10101)			
Q 56	IC,(74F160)			
Q 57	IC,(10124)			
Q 58	IC,(MC12040L)			
Q 59	Not assigned			
Q 60	Not assigned			
Q 61	IC,(10124)			

( ): Manufacturer's part number
• : Selected at factory

Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING		NOTE
Q 62	IC,(10125)			
Q 63	IC,(74S04)			
Q 64	IC,(74F151)			
Q 65	IC,(74F161)			
Q 66	IC,(74F151)			
Q 67	IC,(74F160)			
Q 68	IC,(74F00)			
Q 69	Not assigned			
Q 70	Not assigned			
Q 71	IC,(74F161)			
Q 72	IC,(74F374)			
Q 73	IC,(74F374)			
Q 74	IC,(74F374)			
Q 75	IC,(74F374)			
Q 76	IC,(74F74)			
Q 77	IC,(74F00)			
Q 78	IC,(74F164)			
Q 79	Not assigned			
Q 80	Not assigned			
Q 81	IC,(74F164)			
Q 82	IC,(74F175)			
Q 83	IC,(74S04)			
Q 84	IC,(74S04)			
R 1	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 2	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 3	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 4	CF,(ARD25T100J)	10Ω,±5%,1/4W		
R 5	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 6	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 7	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 8	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 9	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 10	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 11	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 12	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 13	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R 14	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R 15	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R 16	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R 17	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 18	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 19	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 20	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 21	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 22	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING	NOTE
R 23	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R 24	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R 25	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R 26	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R 27	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R 28	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R 29	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R 30	CF,(ARD25T272J)	2.7kΩ,±5%,1/4W	
R 31	Not assigned		
R 32	MF,(RN14K2E9090D)	909Ω,±0.5%,1/4W	
R 33	Not assigned		
R 34	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 35	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R 36	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R 37	CF,(ARD25T333J)	33kΩ,±5%,1/4W	
R 38	CF,(ARD25T183J)	18kΩ,±5%,1/4W	
R 39	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 40	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 41	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R 42	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R 43	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R 44	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
* 45	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R 46	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R 47	Not assigned		
R 48	MF,(RN14K2E1001D)	1.00kΩ,±0.5%,1/4W	
R 49	MF,(RN14K2E2491D)	2.49kΩ,±0.5%,1/4W	
R 50	MF,(RN14K2E2741D)	2.74kΩ,±0.5%,1/4W	
R 51	MF,(RN14K2E3011D)	3.01kΩ,±0.5%,1/4W	
R 52	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W	
R 53	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W	
R 54	Not assigned		
R 55	Not assigned		
R 56	Not assigned		
R 57	Not assigned		
R 58	Not assigned		
R 59	MF,(RN14K2H330J)	33Ω,±5%,1/2W	
R 60	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 61	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 62	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 63	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 64	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 65	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 66	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 67	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 68	Not assigned		
R 69	Not assigned		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A4 JITTER MODULATION (TRANSMITTER) 5

CKT REF	DESCRIPTION	RATING	NOTE
R 70	SIP type,(RRS-4-471JA)	470Ω x 4,±5%,1/8W	
R 71	SIP type,(RRS-8-681JA)	680Ω x 8,±5%,1/8W	
R 72	SIP type,(RRS-6-681JA)	680Ω x 6,±5%,1/8W	
R 73	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 74	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 75	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 76	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R 77	MF,(RN14K2E8660D)	866Ω,±0.5%,1/4W	
R 78	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 79	MF,(RN14K2E1431D)	1.43kΩ,±0.5%,1/4W	
R 80	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R 81	MF,(RN14K2E1001D)	1.0kΩ,±0.5%,1/4W	
R 82	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R 83	MF,(RN14K2E69R8D)	69.8Ω,±0.5%,1/4W	
R 84	MF,(RN14K2E1210D)	121Ω,±0.5%,1/4W	
R 85	MF,(RN14K2E32R4D)	32.4Ω,±0.5%,1/4W	
R 86	MF,(RN14K2E * D)	10.0 to 51.1Ω,±5%, 1/4W	*
R 87	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 88	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R 89	MF,(RN14K2E5760D)	576Ω,±0.5%,1/4W	
R 90	MF,(RN14K2E7500D)	750Ω,±0.5%,1/4W	
R 91	MF,(RN14K2E6980D)	698Ω,±0.5%,1/4W	
R 92	MF,(RN14K2E2431D)	2.43kΩ,±0.5%,1/4W	
R 93	MF,(RN14K2E2871D)	2.87kΩ,±0.5%,1/4W	
R 94	MF,(RN14K2E3161D)	3.16kΩ,±0.5%,1/4W	
R 95	MF,(RN14K2E2611D)	2.61kΩ,±0.5%,1/4W	
R 96	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R 97	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 98	CM,var,(RGS4H204)	200kΩ,1/4W	
R 99	CM,var,(RGS4H204)	200kΩ,1/4W	
R100	CM,var,(RGS4H204)	200kΩ,1/4W	

( ): Manufacturer's part number
* : Selected at factory

Parts List: A5 MODULATION SIGNAL GENERATOR (TRANSMITTER) 6

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 2	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 3	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 4	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 5	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 6	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 7	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 8	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 9	Cer,(CC45CH1H100DY)	10pF,±0.25%,50V	
C 10	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 11	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 12	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 13	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 14	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 15	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 16	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 17	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 18	Cer,(CC92CH1H102J)	1000pF,±5%,50V	
C 19	Cer,(CC924CH1H221J)	220pF,±5%,50V	
C 20	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 21	Cer,(CC924CH1H221J)	220pF,±5%,50V	
C 22	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 23	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 24	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 25	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 26	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 27	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 28	Plast,(ECQ-P1123FZ)	12000pF,±1%,100V	
C 29	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 30	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 31	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 32	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 33	Cer,(CC45CH1H101JY)	100pF,±5%,50V	
C 34	Plast,(ECQ-P1473FZ)	47000pF,±1%,100V	
C 35	Plast,(ECQ-P1123FZ)	12000pF,±1%,100V	
C 36	Plast,(ECQ-P1473FZ)	47000pF,±1%,100V	
C 37	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
J 1	Plug,(CNF3-16P-2.54DSA)	16pins	
J 2	Plug,(DF1-2P2.5DSA)	2pins	
L 1	Coil,(LF8-221K)	220μH,±10%	
L 2	Coil,(LF8-391K)	390μH,±10%	
L 3	Coil,(LF8-221K)	220μH,±10%	
L 4	Coil,(LH1-123K)	12mH,±10%	

( ): Manufacturer's part number
* : Selected at factory

Parts List: A5 MODULATION SIGNAL GENERATOR (TRANSMITTER) 6

CKT REF	DESCRIPTION	RATING	NOTE
L 5	Coil,(LH1-183K)	18mH,±10%	
L 6	Coil,(LH1-123K)	12mH,±10%	
Q 1	IC,(NJM5534D)		
Q 2	IC,(NJM5534D)		
Q 3	IC,(AD7533LN)		
Q 4	IC,(74LS365A)		
Q 5	IC,(74HC74)		
Q 6	IC,(74HC74)		
Q 7	IC,(74HC595)		
Q 8	IC,(74HC273)		
Q 9	IC,(LT1016CN8)		
Q 10	IC,(74HC595)		
Q 11	IC,(74HC283)		
Q 12	IC,(74CH273)		
Q 13	IC,(74LS00)		
Q 14	IC,(74LS390)		
Q 15	IC,(NJM5534D)		
Q 16	IC,(74HC595)		
Q 17	IC,(74HC283)		
Q 18	IC,(EPROM32KX8-20C)		
Q 19	IC,(NJM5534D)		
Q 20	IC,(NJU201AD)		
Q 21	IC,(74HC283)		
Q 22	IC,(74HC283)		
Q 23	IC,(74HC273)		
Q 24	IC,(74LS273)		
Q 25	IC,(μPC624C)		
Q 26	Di,breakdown,(1SZ52)	5.9 to 6.5V,250mW	
R 1	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 2	MF,(RN14K2E4751D)	4.75kΩ,±0.5%,1/4W	
R 3	CM,var,(RJ-6P 2kΩ)	2kΩ,1/2W	
R 4	MF,(RN14K2E1001D)	1.0kΩ,±0.5%,1/4W	
R 5	MF,(RN14K2E1001D)	1.0kΩ,±0.5%,1/4W	
R 6	CM,var,(RJ-6P 100Ω)	100Ω,1/2W	
R 7	MF,(RN14K2E6040D)	604Ω,±0.5%,1/4W	
R 8	Not assigned		
R 9	MF,(RN14K2E6040D)	604Ω,±0.5%,1/4W	
R 10	MF,(RN14K2E5110D)	511Ω,±0.5%,1/4W	
R 11	MF,(RN14K2E5110D)	511Ω,±0.5%,1/4W	
R 12	MF,(RN14K2E6040D)	604Ω,±0.5%,1/4W	
R 13	MF,(RN14K2E3011D)	3.01kΩ,±0.5%,1/4W	
R 14	MF,(RN14K2E3011D)	3.01kΩ,±0.5%,1/4W	
R 15	CF,(ARD25T681J)	680Ω,±5%,1/4W	

( ): Manufacturer's part number
* : Selected at factory

Parts List: A5 MODULATION SIGNAL GENERATOR (TRANSMITTER) 6

CKT REF	DESCRIPTION	RATING		NOTE
R 16	SIP type,(RRS-6-103JA)	10kΩ x 6,±5%,1/8W		
R 17	Not assigned			
R 18	Not assigned			
R 19	Not assigned			
R 20	MF,(RN14K2E1502D)	15.0kΩ,±0.5%,1/4W		
Z 1	XTAL OSC,(TD308C)	3.277MHz		

( ): Manufacturer's part number
* : Selected at factory

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Parts List: A6 T-SWITCH (TRANSMITTER) 7

CKT REF	DESCRIPTION	RATING		NOTE
J 1	Plug,(CNF3-16P-2.54DSA)	16pins		
J 2	Plug,(DF1-8P2.5DSA)	8pins		
S 1	Switch,(SLEP223D-F)			
S 2	Switch,(SLEP222D-G)			
S 3	Switch,(SLEP223D-F)			
S 4	Not assigned			
S 5	Not assigned			
S 6	Switch,(DIP-A(8))			
S 7	Switch,(DISS2A)			

( ): Manufacturer's part number
* : Selected at factory

44W90993 | 1/1

Parts List : A7 (Option 41) GP-IB 8

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Elect,(CE02C1A470)	47μF,±20%,10V		
C 2	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 3	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 4	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 5	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 6	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 7	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 8	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
J 1	Pattern			
J 2	Connector, (57LE-20240-27C0-D35H)			
Q 1	IC,(75160A)			
Q 2	IC,(75162A)			
Q 3	IC,(μPD7210C)			
Q 4	IC,(74LS00)			
Q 5	IC,(74LS367A)			
Q 6	IC,(74LS240)			
Q 7	IC,(74LS74A)			
Q 8	IC,(74LS32)			
Q 9	IC,(74LS139)			
R 1	Single in-line array, (1HR-8-103JA)	10kΩ x 8,1/8W		
S 1	Dip,(BP-8)			

( ): Manufacturer's part number
* : Selected at factory

44W83046 | 1/1

Parts List : A8 (Option 43) RS-232C 9

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Elect,(CE02C1A470)	47μF,±20%,10V		
C 2	Elect,(CE02C1C330)	33μF,±20%,16V		
C 3	Elect,(CE02C1C330)	33μF,±20%,16V		
C 4	Cer,(CC924CH1H151J)	150pF,±5%,50V		
C 5	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 6	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 7	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 8	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C 9	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C10	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C11	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C12	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
C13	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V		
J 1	Pattern			
J 2	Connector, (DB-25SA-J4)			
Q 1	IC,(SN75189AN)			
Q 2	IC,(74LS240)			
Q 3	IC,(SN75188N)			
Q 4	IC,(μPD8251AFC)			
Q 5	IC,(74LS04)			
Q 6	IC,(74LS367A)			
Q 7	IC,(COM8146)			
Q 8	IC,(74LS139)			
R 1	Single in-line array, (1HR-8-103JA)	10kΩ x 8,1/8W		
R 2	Single in-line array, (1HR-4-103JA)	10kΩ x 4,1/8W		
S 1	Dip,(S-2031)			
S 2	Dip,(B-8A)			
X 1	XTAL OSC,(NX-5068)	5.0688MHz		

( ): Manufacturer's part number
* : Selected at factory

44W83047 | 1/1

Parts List: DIGITAL TRANSMISSION ANALYZER ME3401A RECEIVER 10

CKT REF	DESCRIPTION	RATING	NOTE
A 1	ERROR DET(422U13838)		44W88390
A 2	R-CONTROL(422U14527)		44W91570
A 3	R-DISPLAY(422U13842)		44W88392
A 4	R-SWITCH(442U88382)		44W88394
A 5	JITTER MEASUREMENT (422U13911)		44W88395 OPT02
A 6	GP-IB(442U83054)		44W83046 OPT42
A 7	RS-232C(442U83056)		44W83047 OPT44
A 8	PRINTER		44W85802 OPT11
A 9	DS-1 OUTPUT(442U95076)		44W95156 OPT 03
G 1	Fan,(FBK-08A12LZ)		
J 1	Jack,(DF1-15S2.5R24)		
J 2	Jack,(DF1-2S2.5R24)		
J 3	Jack,(DF1-2S2.5R24)		
J 4	Jack,(DF1-2S2.5R24)		
J 5	Jack,(U-SB1003)		
J 6	Jack,(DF1-8S2.5R24)		
J 7	Cable, (HIF3BA5B-34DAA26S)		
J 8	Terminal,(44E87532)		
J 9	Terminal,(ML-9DE(2P))		
J 10	Jack,(DF1-2S2.5R24)		
J 11	Receptacle, (BNC-R-101-NI)		
J 12	Receptacle, (BNC-R-101-NI)		
J 13	Receptacle, (BNC-R-101-NI)		
J 14	Receptacle, (BNC-R-101-NI)		
J 15	Receptacle, (BNC-R-101-NI)		
J 16	Receptacle, (BNC-R-101-NI)		OPT 03
J 17	Receptacle, (BNC-R-101-NI)		OPT 03
J 18	Receptacle, (BNC-R-101-NI)		
J 19	Jack,(DF1-2S2.5R24)		
J 20	Cable,(CNF3-20D-AA030S)		
J 21	Inlet,(NC-165)		

Parts List: DIGITAL TRANSMISSION ANALYZER ME3401A RECEIVER 10

CKT REF	DESCRIPTION	RATING	NOTE
J 22	Jack,(DF1-10S2.5R24)		
J 23	Jack,(DF1-10S2.4R24)		OPT 03
J 24	Jack,(DF1-3S2.4R24)		OPT 03
J 25	Jack,(DF1-2S2.5R24)		OPT 03
J 26	Jack,(44J84152)		OPT 03 OPT 03
S 1	Switch,(ESB-76)		
S 2	Switch,(8E3011)		
S 3	Switch,(SLBL222C-B)		OPT 03
T 1	Power,(44T88343)	123VA	
Z 1	Line filter, (MBW-1202-33)		

Parts List: A2 R-CONTROL (RECEIVER) 11

CKT REF	DESCRIPTION	RATING	NOTE
B 1	Buzzer,(KMB-06)		
C 1	Elect,(SME80LISS-10000SOD)	10000μF,±20%,80V	
C 2	Elect,(CE04C1J100A)	10μF,±20%,63V	
C 3	Elect,(CE04C1V221A)	220μF,±20%,35V	
C 4	Elect,(CE04C1E470A)	47μF,±20%,25V	
C 5	Elect,(CE04C1V221A)	220μF,±20%,35V	
C 6	Elect,(SXE35VB-680 ϕ12.5 x 25)	680μF,±20%,35V	
C 7	Elect,(SXE25VB-1000 ϕ12.5 x 25)	1000μF,±20%,25V	
C 8	Elect,(SXE25VB-1000 ϕ12.5 x 25)	1000μF,±20%,25V	
C 9	Elect,(SXE16VB-1500 ϕ12.5 x 25)	1500μF,±20%,16V	
C 10	Elect,(SXE16VB-1500 ϕ12.5 x 25)	1500μF,±20%,16V	
C 11	Elect,(SXE16VB-1500 ϕ12.5 x 25)	1500μF,±20%,16V	
C 12	Elect,(SXE50VB-2200 ϕ18 x 40)	2200μF,±20%,50V	
C 13	Elect,(CE04C1V102A)	1000μF,±20%,35V	
C 14	Elect,(CE04C1E221A)	220μF,±20%,25V	
C 15	Elect,(CE04C1J470A)	47μF,±20%,63V	
C 16	Plast,(ECQ-P1102FZ)	1000pF,±1%,100V	
C 17	Cer,(CC924CH1H102J)	1000pF,±5%,50V	
C 18	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 19	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 20	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 21	Elect,(CE04C1C331A)	330μF,±20%,16V	
C 22	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 23	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 24	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 25	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 26	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 27	Not assigned		
C 28	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 29	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 30	Elect,(CE04C1H2R2A)	2.2μF,±20%,50V	
C 31	Elect,(CE04C1H2R2A)	2.2μF,±20%,50V	
C 32	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 33	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 34	Elect,(CE04C1E101A)	100μF,±20%,25V	
C 35	Elect,(CE04C1E101A)	100μF,±20%,25V	
C 36	Elect,(CE04C1V102A)	1000μF,±20%,35V	

Parts List: A2 R-CONTROL (RECEIVER) 11

CKT REF	DESCRIPTION	RATING	NOTE
C 37	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 38	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 39	Elect,(CE04C1A221A)	220μF,±20%,10V	
C 40	Cer,(CC924CH1H470J)	47pF,±5%,50V	
C 41	Cer,var,(TZ03R300A)	5.2 to 30pF,100V	
C 42 to C 60	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
F 1	Fuse, (MFS1NN250V6.3ADC01)	6.3A,250V	
F 2	Fuse,(MFS1NN250V1ADC01)	1A,250V	
F 3	Fuse,(MFS1NN250V1ADC01)	1A,250V	
F 4	Fuse,(MFS1NN250V5ADC01)	5A,250V	
F 5	Fuse,(MFS1NN250V2ADC01)	2A,250V	
F 6	Fuse, (MFS1NN250V1.6ADC01)	1.6A,250V	
J 1	Plug,(DF1-1SP2.5DSA)	15pins	
J 2	Plug,(DF1-2P2.5DSA)	2pins	
J 3	Plug,(DF1-2P2.5DSA)	2pins	
J 4	Plug,(CNF3-34P-2.54DSA)	34pins	
J 5	Cable,(CNF23-40D-AA20S)		
J 6	Plug,(CNF3-40P-2.54DSA)	40pins	
J 7	Plug,(CNF3-34P-2.54DSA)	34pins	
J 8	Plug,(CNF3-20P-2.54DSA)	20pins	
K 1	Relay,(OHD3-90M)		
L 1	Coil,(SK-17C-045-650)	650μH	
L 2	Coil,(SK-17C-045-650)	650μH	
L 3	Coil,(SK-17C-045-650)	650μH	
L 4	Coil,(SK-24S-110-100)	100μH	
L 5	Coil,(SK-24S-110-100)	100μH	
L 6	Coil,(SK-21C-070-180)	180μH	
L 7	Coil,(SK-24S-045-3500W)	3.5mH	
M 1	Not assigned		

Parts List: A2 R-CONTROL (RECEIVER) 11

CKT REF	DESCRIPTION	RATING		NOTE
Q 1	IC,(μPC494C)			
Q 2	IC,(μPC1251C)			
Q 3	IC,(μPC393C)			
Q 4	Tr,(2SC3179)			
Q 5	Tr,(2SA1154)			
Q 6	Tr,(2SC3220)			
Q 7	Tr,(2SC3220)			
Q 8	Photo coupler,(PC618)			
Q 9	Photo coupler,(PC817X)			
Q 10	Not assigned			
Q 11	Rectifier, (D5FB20(4002))			
Q 12	Rectifier,(RB-1S2-LFB)			
Q 13	Rectifier,(V03G)			
Q 14	Rectifier,(V19E-1)			
Q 15	Rectifier,(V19E-1)			
Q 16	Rectifier,(V19E-1)			
Q 17	Rectifier,(V19E-1)			
Q 18	Rectifier,(V19E-1)			
Q 19	Rectifier,(V19E-1)			
Q 20	Rectifier,(D5LC20U-4000)			
Q 21	Rectifier,(D8LC20U-4000)			
Q 22	Rectifier,(D8LC20UR-4000)			
Q 23	Rectifier,(D10SC4M)			
Q 24	Rectifier,(D10SC4MR)			
Q 25	Rectifier,(D5LC20U-4000)			
Q 26	Not assigned			
Q 27	Not assigned			
Q 28	Di,breakdown,(RD5.1E)	4.8 to 5.37V,500mW		
Q 29	Di,breakdown,(RD13E)	12.11 to 13.66V, 500mW		
Q 30	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW		
Q 31	Di,breakdown,(RD2.7E)	2.5 to 2.93V,500mW		
Q 32	Di,(1S955)			
Q 33	Di,(1S955)			
Q 34	Di,(1S953)			
Q 35	IC,(μPC14324H)			
Q 36	IC,(SI-3122V)			
Q 37	IC,(μPC16312H)			
Q 38	Not assigned			
Q 39	Not assigned			
Q 40	Di,(1S953)			
Q 41	Di,(1S953)			
Q 42	Not assigned			
Q 43	Not assigned			
Q 44	Not assigned			
Q 45	IC,(74LS245)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A2 R-CONTROL (RECEIVER) 11

CKT REF	DESCRIPTION	RATING		NOTE
Q 46	IC,(μPD8279C-2)			
Q 47	IC,(μPD8279C-2)			
Q 48	IC,(EPROM32KX8-20C)			
Q 49	IC,(EPROM32KX8-20C)			
Q 50	IC,(EPROM32KX8-20C)			
Q 51	IC,(EPROM32KX8-20C)			
Q 52	IC,(SRAM32KX8-C)			
Q 53	IC,(RP5C15P)			
Q 54	IC,(74LS74A)			
Q 55	IC,(74LS245)			
Q 56	IC,(7437)			
Q 57	IC,(74LS74A)			
Q 58	IC,(LH0080B)			DILB40P-8J
Q 59	IC,(74LS14)			
Q 60	IC,(74LS244)			
Q 61	IC,(74LS244)			
Q 62	Not assigned			
Q 63	IC,(74LS74A)			
Q 64	IC,(74LS139)			
Q 65	IC,(74LS138)			
Q 66	IC,(74LS08)			
Q 67	IC,(TC74HC00P)			
Q 68	IC,(74LS155)			
Q 69	IC,(74LS32)			
Q 70	IC,(MB3771)			
Q 71	IC,(74LS04)			
Q 72	IC,(74LS123)			
Q 73	IC,(μPD8259AC-2)			
Q 74	Not assigned			
Q 75	Not assigned			
Q 76	IC,(74LS245)			
Q 77	IC,(74LS244)			
Q 78	IC,(μPD71055C-10)			
Q 79	IC,(μPD71055C-10)			
Q 80	IC,(74LS244)			
Q 81	IC,(74LS244)			
R 1	MF,(RS1FB4.7KΩJ)	4.7kΩ,±5%,1W		
R 2	MF,(RS1FB3.3KΩJ)	3.3kΩ,±5%,1W		
R 3	MF,(RS1FB3.3KΩJ)	3.3kΩ,±5%,1W		
R 4	MF,(RN14K2H101J)	0.1kΩ,±5%,1/2W		
R 5	CF,(ARD25T123J)	12kΩ,±5%,1/4W		
R 6	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 7	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 8	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 9	CF,(ARD25T102J)	1kΩ,±5%,1/4W		

( ): Manufacturer's part number
* : Selected at factory

M-2

Parts List: A2 R-CONTROL (RECEIVER) 11

CKT REF	DESCRIPTION	RATING		NOTE
R 10	MF,(RN14K2H470J)	47Ω,±5%,1/2W		
R 11	MF,(RN14K2H100J)	10Ω,±5%,1/2W		
R 12	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 13	MF,(RN14K2H470J)	47Ω,±5%,1/2W		
R 14	MF,(RN14K2H100J)	10Ω,±5%,1/2W		
R 15	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 16	MF,(RS2FB220ΩJ)	220Ω,±5%,1W		
R 17	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W		
R 18	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 19	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 20	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 21	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 22	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 23	MF,(RN14K2H102J)	1kΩ,±5%,1/2W		
R 24	MF,(RN14K2H102J)	1kΩ,±5%,1/2W		
R 25	MF,(RN14K2H101J)	0.1kΩ,±5%,1/2W		
R 26	MF,(RN14K2H101J)	0.1kΩ,±5%,1/2W		
R 27	Not assigned			
R 28	MF,(RS1FB3.3KΩJ)	3.3kΩ,±5%,1W		
R 29	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 30	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 31	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 32	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 33	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 34	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 35	Not assigned			
R 36	Not assigned			
R 37	Not assigned			
R 38	MF,(RS2FB1KΩJ)	1kΩ,±5%,1W		
R 39	MF,(RS2FB1KΩJ)	1kΩ,±5%,1W		
R 40	CM,var,(RJ-6P 500Ω)	500Ω,1/2W		
R 41	Not assigned			
R 42	Not assigned			
R 43	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 44	MF,(RS2FB22ΩJ)	22Ω,±5%,2W		
R 45	MF,(RN14K2E2741D)	2.74kΩ,±0.5%,1/4W		
R 46	MF,(RN14K2E1001D)	1kΩ,±0.5%,1/4W		
R 47	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 48	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 49	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 50	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 51	Not assigned			
R 52	SIP type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W		
R 53	SIP type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W		
R 54	SIP type,(RRS-4-103JA)	10kΩ x 4,±5%,1/8W		
R 55	SIP type,(RRS-8-103JA)	10kΩ x 8,±5%,1/8W		
R 56	SIP type,(RRS-4-103JA)	10kΩ x 4,±5%,1/8W		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A2 R-CONTROL (RECEIVER) 11

CKT REF	DESCRIPTION	RATING		NOTE
R 57	MF,(RS2FB22ΩJ)	22Ω,±5%,2W		
R 58	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 59	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 60	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
T 1	Trans,(44T75381)			
T 2	Trans,(44T75381)			
T 3	Trans,(439T36050)			
X 1	XTAL,(MX-38)	32.768KHz		
Z 1	XTAL OSC,(TD308C)	8MHz		
Z 2	Battery,(BR-AE2SP)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
C 1	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 2	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 3	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 4	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 5	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 6	Not assigned			
C 7 to C 19	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 20	Elect,(CE04C1C331A)	330uF,±20%,16V		
C 21	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 22	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 23	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 24	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 25	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 26	Cer,(RPE113F105Z50)	1uF,+80/-20%,50V		
C 27	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 28	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 29	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 30	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 31	Elect,(CE04C1V330A)	33uF,±20%,35V		
C 32	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 33	Not assigned			
C 34	Not assigned			
C 35	Elect,(CE04C1CJ31A)	330uF,±20%,16V		
C 36	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 37	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 38	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 39	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 40	Not assigned			
C 41	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 42	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 43	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 44	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 45	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 46	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 47	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 48	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 49	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 50	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 51	Cer,(RPE110CK0R5C50)	0.5pF,±0.25pF,50V		
C 52	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 53	Cer,(CC45CH1H151JY)	150pF,±5%,50V		
C 54	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 55	Cer,(CC924CH1H391J)	390pF,±5%,50V		
C 56	Elect,(CE04C1C331A)	330uF,±20%,16V		
C 57	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
C 58	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 59	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 60	Elect,(CE04C1C331A)	330uF,±20%,16V		
C 61	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 62	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 63	Cer,(RPE113F105Z50)	1uF,+80/-20%,50V		
C 64	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 65	Cer,(RPE113F105Z50)	1uF,+80/-20%,50V		
C 66	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 67	Cer,(RPE113F105Z50)	1uF,+80/-20%,50V		
C 68 to C 78	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 79	Cer,(CC45CH1H*JY)	11 to 30pF,±5%,50V		*18pF
C 80	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 81	Not assigned			
C 82 to C 93	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 94	Cer,(CC924CH1H681J)	680pF,±5%,50V		
C 95	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 96	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 97	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 98	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 99	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C100	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C101	Elect,(CE04C1C331A)	330uF,±20%,16V		
C102	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C103	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C104	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C105	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C106	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C107	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C108	Elect,(CE04C1C331A)	330uF,±20%,16V		
C109	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C110	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C111	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C112	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C113	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C114	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C115	Elect,(CE04C1C331A)	330uF,±20%,16V		
C116	Elect,(CE04C1C331A)	330uF,±20%,16V		
C117	Elect,(CE04C1C331A)	330uF,±20%,16V		
C118	Elect,(CE04C1C331A)	330uF,±20%,16V		
C119	Elect,(CE04C1C331A)	330uF,±20%,16V		
C120	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C121	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
C122	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C123	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C124	Elect,(CE04C1H100A)	10uF,±20%,50V		
C125	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C126	Elect,(CE04C1H100A)	10uF,±20%,50V		
C127	Elect,(CE04C1H100A)	10uF,±20%,50V		
C128	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C129	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C130	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C131	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C132	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C133	Elect,(CE04C1H100A)	10uF,±20%,50V		
C134	Elect,(CE04C1H100A)	10uF,±20%,50V		
C135	Elect,(CE04C1H100A)	10uF,±20%,50V		
C136	Elect,(CE04C1H100A)	10uF,±20%,50V		
C137	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C138	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C139	Elect,(CE04C1E101A)	100uF,±20%,25V		
C140	Elect,(CE04C1E101A)	100uF,±20%,25V		
C141	Elect,(CE04C1E101A)	100uF,±20%,25V		
C142	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C143	Not assigned			
C144	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C145	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C146	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C147	Not assigned			
CI48	Not assigned			
C149	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C150	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C151	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C152	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C153	Cer,(CC924CH1H470J)	47pF,±5%,50V		
C154	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C155	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C156	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C157	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C158	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C159	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
J 1	Plug,(DF1-2P2.5DSA)	2pins		
J 2	Plug,(U-PB1021)			
J 3	Cable,(CNF23-40D-AA20S)			
J 4	Plug,(CNF3-26P-2.54DS)	26pins		
J 5	Receptacle,(BNC-R-NI)			
J 6	Receptacle,(BNC-R-NI)			
J 7	Receptacle,(JACK238)			

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
J 8	Receptacle,(BNC-R-NI)			
J 9	Plug,(DF1-8P2.5DSA)	8pins		
J 10	Plug,(DF1-10P2.5DSA)	10pins		
J 11	Connector,(DIC-149-3P)			
J 12	Connector,(DIC-128)			
K 1	Relay,(SVR-5V)			
K 2	Relay,(SVR-5V)			
K 3	Relay,(SVR-5V)			
K 4	Relay,(SVR-5V)			
L 1	Coil,(SP0408-R47K)	0.47μH,±10%		
L 2	Coil,(SP0408-3R3K)	3.3μH,±10%		
L 3	Coil,(SP0408-4R7K)	4.7μH,±10%		
L 4	Coil,(SP0408-120K)	120μH,±10%		
Q 1	Di,vari-cap,(FC-51M)			
Q 2	Di,vari-cap,(FC-51M)			
Q 3	Di,vari-cap,(FC-51M)			
Q 4	Tr,(2SC1907)			
Q 5	Tr,(2SC1907)			
Q 6	Tr,(2SC1907)			
Q 7	Tr,(2SC1907)			
Q 8	Tr,(2SC1907)			
Q 9	Tr,(2SC1907)			
Q 10	Tr,(2SC1907)			
Q 11	Di,(1S953)			
Q 12	Di,(1S953)			
Q 13	Tr,(2SC1907)			
Q 14	FET,(3SK59)			
Q 15	Tr,(2SC1907)			
Q 16	Tr,(2SC1907)			
Q 17	IC,(μPC151C)			
Q 18	Tr,(2SC2498)			
Q 19	Di,(1S953)			
Q 20	Di,(1S953)			
Q 21	Tr,(2SC1907)			
Q 22	Di,(1S953)			
Q 23	Di,breakdown,(RD6.2E)	5.78 to 6.44V,500mW		
Q 24	Di,(1S953)			
Q 25	Tr,(2SC2498)			
Q 26	Tr,(2SC2498)			
Q 27	IC,(10102)			
Q 28	Di,(1S953)			
Q 29	Di,breakdown,(RD6.2E)	5.78 to 6.44V,500mW		

( ): Manufacturer's part number
• : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
Q 30	Tr,(2SC1907)			
Q 31	Di,(1S953)			
Q 32	Tr,(2SC1907)			
Q 33	Tr,(2SC1907)			
Q 34	Tr,(2SC2498)			
Q 35	Tr,(2SC2498)			
Q 36	IC,(10102)			
Q 37	Di,(1S953)			
Q 38	Tr,(2SC1907)			
Q 39	IC,(74LS139)			
Q 40	Not assigned			
Q 41	Not assigned			
Q 42	IC,(74LS38)			
Q 43	Not assigned			
Q 44	IC,(74LS04)			
Q 45	IC,(74LS08)			
Q 46	IC,(74LS290)			
Q 47	IC,(74LS51)			
Q 48	IC,(μPC1656C)			
Q 49	IC,(μPC1656C)			
Q 50	Tr,(2SC1907)			
Q 51	Di,(1S953)			
Q 52	Tr,(2SC2498)			
Q 53	Tr,(2SC2498)			
Q 54	Di,(1S953)			
Q 55	Tr,(2SC2498)			
Q 56	Tr,(2SC2498)			
Q 57	Di,(1S953)			
Q 58	Di,(1S953)			
Q 59	IC,(10116)			
Q 60	IC,(10111)			
Q 61	IC,(10105)			
Q 62	IC,(10125)			
Q 63	IC,(MC10H105)			
Q 64	FET,(3SK47K)			
Q 65	IC,(MC10H105)			
Q 66	FET,(3SK47K)			
Q 67	IC,(MC10H105)			
Q 68	FET,(3SK47K)			
Q 69	FET,(3SK47K)			
Q 70	IC,(10125)			
Q 71	IC,(10124)			
Q 72	IC,(10124)			
Q 73	IC,(μPC151C)			
Q 74	Di,breakdown,(RD6.2E)	5.78 to 6.44V,500mW		
Q 75	Di,(1S953)			
Q 76	Tr,(2SC1907)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
Q 77	Tr,(2SC1907)			
Q 78	Tr,(2SA1206)			
Q 79	Tr,(2SA1206)			
Q 80	Not assigned			
Q 81	Tr,(2SA1206)			
Q 82	Di,(1S953)			
Q 83	Di,breakdown,(RD3.6E)	3.4 to 3.845V,500mW		
Q 84	Tr,(2SA1206)			
Q 85	Tr,(2SA1206)			
Q 86	Not assigned			
Q 87	Tr,(2SA1206)			
Q 88	Not assigned			
Q 89	Tr,(2SC1907)			
Q 90	IC,(AB109CSP)			
Q 91	IC,(μPD7011C)			
Q 92	IC,(74S04)			
Q 93	IC,(74F74)			
Q 94	IC,(74F02)			
Q 95	IC,(74F175)			
Q 96	IC,(μPD8255AC-2)			
Q 97	IC,(74LS245)			
Q 98	IC,(74F175)			
Q 99	IC,(74F74)			
Q100	IC,(74F74)			
Q101	IC,(74LS393)			
Q102	IC,(74F00)			
Q103	IC,(74F74)			
Q104	IC,(74F74)			
Q105	IC,(74LS393)			
Q106	IC,(μPD8255AC-2)			
Q107	IC,(74LS244)			
Q108	IC,(74LS123)			
Q109	IC,(74F153)			
Q110	IC,(74LS293)			
Q111	IC,(74S00)			
Q112	IC,(74LS157)			
Q113	IC,(74LS02)			
Q114	IC,(74LS244)			
Q115	IC,(74LS123)			
Q116	IC,(74LS123)			
Q117	IC,(74LS00)			
Q118	IC,(74LS153)			
Q119	IC,(74LS123)			
Q120	IC,(μPD8253C-2)			
Q121	IC,(μPD8253C-2)			
Q122	IC,(μPD8253C-2)			
Q123	IC,(μPD8253C-2)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
Q124	IC,(74LS138)			
Q125	IC,(74LS21)			
Q126	IC,(74LS08)			
Q127	IC,(74LS74)			
Q128	IC,(74LS123)			
Q129	IC,(74LS08)			
Q130	Di,(1S953)			
Q131	Tr,(2SC1907)			
Q132	IC,(74F74)			
R 1	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 2	CM,var,(RJ-6P 2KΩ)	2kΩ,1/2W		
R 3	CF,(ARD25T333J)	33kΩ,±5%,1/4W		
R 4	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 5	CF,(ARD25T150J)	15Ω,±5%,1/4W		
R 6	CF,(ARD25T750J)	75Ω,±5%,1/4W		
R 7	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 8	CF,(ARD25T333J)	33kΩ,±5%,1/4W		
R 9	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 10	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 11	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 12	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 13	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 14	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 15	CF,(ARD25T181J)	180Ω,±5%,1/4W		
R 16	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 17	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 18	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 19	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 20	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 21	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 22	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 23	CF,(ARD25T750J)	75Ω,±5%,1/4W		
R 24	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 25	Not assigned			
R 26	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 27	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 28	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 29	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R 30	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 31	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 32	CF,(ARD25T181J)	180Ω,±5%,1/4W		
R 33	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 34	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 35	Not assigned			
R 36	CF,(ARD25T471J)	470Ω,±5%,1/4W		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING		NOTE
R 37	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R 38	CF,(ARD25T100J)	10Ω,±5%,1/4W		
R 39	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 40	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 41	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 42	CF,(ARD25T153J)	15kΩ,±5%,1/4W		
R 43	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 44	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 45	CF,(ARD25T301J)	300Ω,±5%,1/4W		
R 46	CF,(ARD25T510J)	51Ω,±5%,1/4W		
R 47	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 48	CF,(ARD25T105J)	1MΩ,±5%,1/4W		
R 49	CM,var,(RJ-6P 2KΩ)	2kΩ,1/2W		
R 50	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 51	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 52	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 53	CM,var,(RJ-6P 2KΩ)	2kΩ,1/2W		
R 54	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 55	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 56	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 57	CF,(ARD25T471J)	470Ω,±5%,1/4W		
R 58	Not assigned			
R 59	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 60	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 61	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 62	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R 63	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 64	CF,(ARD25T330J)	33Ω,±5%,1/4W		
R 65	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 66	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 67	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 68	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W		
R 69	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W		
R 70	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W		
R 71	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 72	CF,(ARD25T561J)	560Ω,±5%,1/4W		
R 73	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W		
R 74	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 75	CF,(ARD25T181J)	180Ω,±5%,1/4W		
R 76	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 77	SIP type,(RRS-6-681JA)	680Ω x 6,±5%,1/8W		
R 78	CF,(ARD25T181J)	180Ω,±5%,1/4W		
R 79	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 80	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 81	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 82	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W		
R 83	MF,(RN14K2E1000D)	100Ω,±0.5%,1/4W		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING	NOTE
R 84	MF,(RN14K2E4640D)	464Ω,±0.5%,1/4W	
R 85	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 86	MF,(RN14K2H221J)	0.22kΩ,±5%,1/2W	
R 87	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R 88	SIP type,(RRS-4-681JA)	680Ω x 4,±5%,1/8W	
R 89	Not assigned		
R 90	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 91	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R 92	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R 93	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R 94	CF,(ARD25T181J)	180Ω,±5%,1/4W	
R 95	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W	
R 96	MF,(RN14K2E1000D)	100Ω,±0.5%,1/4W	
R 97	CF,(ARD25T822J)	8.2kΩ,±5%,1/4W	
R 98	MF,(RN14K2E3920D)	392Ω,±0.5%,1/4W	
R 99	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R100	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R101	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R102	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R103	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R104	CF,(ARD25T182J)	1.8kΩ,±5%,1/4W	
R105	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R106	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R107	CM,var,(RJ-6P 500Ω)	500Ω,1/2W	
R108	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R109	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R110	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R111	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R112	MF,(RN14K2H680J)	68Ω,±5%,1/2W	
R113	CF,(ARD25T561J)	560Ω,±5%,1/4W	
R114	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R115	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W	
R116	CF,(ARD25T682J)	6.8kΩ,±5%,1/4W	
R117	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R118	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W	
R119	CF,(ARD25T510J)	51Ω,±5%,1/4W	
R120	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R121	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R122	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R123	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R124	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R125	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R126	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R127	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R128	CF,(ARD25T821J)	820Ω,±5%,1/4W	
R129	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R130	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W	

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( ): Manufacturer's part number
*: Selected at factory

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Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING	NOTE
R131	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R132	CF,(ARD25T750J)	75Ω,±5%,1/4W	
R133	CF,(ARD25T392J)	3.9kΩ,±5%,1/4W	
R134	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R135	Not assigned		
R136	Not assigned		
R137	Not assigned		
R138	Not assigned		
R139	Not assigned		
R140	Not assigned		
R141	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R142	SIP type,(RRS-4-681JA)	680Ω x 4,±5%,1/8W	
R143	CF,(ARD25T330J)	33Ω,±5%,1/4W	
R144	CM,var,(RJ-6P 20Ω)	20Ω,1/2W	
R145	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R146	CF,(ARD25T561J)	560Ω,±5%,1/4W	
R147	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R148	SIP type,(RRS-4-681JA)	680Ω x 4,±5%,1/8W	
R149	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R150	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R151	CF,(ARD25T681J)	680Ω,±5%,1/4W	
R152	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R153	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R154	CF,(ARD25T820J)	82Ω,±5%,1/4W	
R155	CM,var,(RJ-6P 50Ω)	50Ω,1/2W	
R156	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R157	CF,(ARD25T561J)	560Ω,±5%,1/4W	
R158	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R159	SIP type,(RRS-4-681JA)	680Ω x 4,±5%,1/8W	
R160	CF,(ARD25T121J)	120Ω,±5%,1/4W	
R161	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R162	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R163	SIP type,(RRS-6-681JA)	680Ω x 6,±5%,1/8W	
R164	CF,(ARD25T680J)	68Ω,±5%,1/4W	
R165	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R166	CM,var,(RJ-6P 50Ω)	50Ω,1/2W	
R167	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R168	CF,(ARD25T561J)	560Ω,±5%,1/4W	
R169	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R170	CF,(ARD25T680J)	68Ω,±5%,1/4W	
R171	Not assigned		
R172	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R173	CF,(ARD25T391J)	390Ω,±5%,1/4W	
R174	CF,(ARD25T820J)	82Ω,±5%,1/4W	
R175	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R176	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R177	CF,(ARD25T221J)	220Ω,±5%,1/4W	

( ): Manufacturer's part number
*: Selected at factory

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Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING	NOTE
R178	CF,(ARD25T181J)	180Ω,±5%,1/4W	
R179	MF,(RN14K2E7680D)	768Ω,±0.5%,1/4W	
R180	CM,var,(RJ-6P 50Ω)	50Ω,1/2W	
R181	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R182	CF,(ARD25T561J)	560Ω,±5%,1/4W	
R183	CF,(ARD25T820J)	82Ω,±5%,1/4W	
R184	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R185	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R186	CM,var,(RJ-6P 10KΩ)	10kΩ,1/2W	
R187	MF,(RN14K2E4991D)	4.99kΩ,±0.5%,1/4W	
R188	CM,var,(RJ-6P 100KΩ)	100kΩ,1/2W	
R189	MF,(RN14K2E2001D)	2kΩ,±0.5%,1/4W	
R190	CF,(ARD25T682J)	6.8kΩ,±5%,1/4W	
R191	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R192	MF,(RN14K2H391J)	0.39kΩ,±5%,1/2W	
R193	MF,(RN14K2H391J)	0.39kΩ,±5%,1/2W	
R194	SIP type,(RRS-4-103JA)	10kΩ x 4,±5%,1/8W	
R195	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R196	MF,(RN14K2E1210D)	121Ω,±0.5%,1/4W	
R197	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R198	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R199	CF,(ARD25T182J)	1.8kΩ,±5%,1/4W	
R200	CM,var,(RJ-6P 200Ω)	200Ω,1/2W	
R201	MF,(RN14K2E1210D)	121Ω,±0.5%,1/4W	
R202	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R203	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R204	CF,(ARD25T182J)	1.8kΩ,±5%,1/4W	
R205	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R206	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R207	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R208	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R209	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R210	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R211	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R212	Not assigned		
R213	Not assigned		
R214	Not assigned		
R215	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R216	Not assigned		
R217	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W	
R218	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R219	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R220	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R221	Not assigned		
R222	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R223	Not assigned		
R224	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W	

( ): Manufacturer's part number
*: Selected at factory

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Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING	NOTE
R225	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R226	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R227	Not assigned		
R228	CM,var,(RJ-6P 1KΩ)	1kΩ,1/2W	
R229	CF,(ARD25T182J)	1.8kΩ,±5%,1/4W	
R230	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R231	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R232	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R233	CF,(ARD25T104J)	100kΩ,±5%,1/4W	
R234	Not assigned		
R235	CF,(ARD25T104J)	100kΩ,±5%,1/4W	
R236	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R237	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R238	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R239	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R240	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R241	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R242	CF,(ARD25T561J)	560Ω,±5%,1/4W	
R243	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R244	CF,(ARD25T271J)	270Ω,±5%,1/4W	
R245	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W	
R246	CF,(ARD25T471J)	470Ω,±5%,1/4W	
R247	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R248	CF,(ARD25T181J)	180Ω,±5%,1/4W	
R249	Not assigned		
R250	Not assigned		
R251	CF,(ARD25T181J)	180Ω,±5%,1/4W	
R252	CF,(ARD25T111J)	110Ω,±5%,1/4W	
R253	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W	
R254	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R255	Not assigned		
R256	CF,(ARD25T473J)	47kΩ,±5%,1/4W	
R257	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R258	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R259	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R260	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R261	CF,(ARD25T331J)	330Ω,±5%,1/4W	
R262	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R263	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R264	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R265	CF,(ARD25T151J)	150Ω,±5%,1/4W	
R266	CF,(ARD25T561J)	560Ω,±5%,1/4W	
R267	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W	
R268	CM,var,(RJ-6P 2KΩ)	2kΩ,1/2W	
S 1	DIP,(51D-0401)		

( ): Manufacturer's part number
*: Selected at factory

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Parts List: A1 ERROR DET (RECEIVER) 12

CKT REF	DESCRIPTION	RATING	NOTE
T 1	Trans,(342T67152C)		
Z 1	Delay line,(AT-08)		
Z 2	Delay line,(AT-08)		
Z 3	Delay line,(AT-04)		
Z 4	Delay line,(AT-50)		
Z 5	Delay line,(AT-30)		
Z 6	Delay line,(AN-150)		

( ): Manufacturer s part number
• : Selected at factory

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Parts List: A3 R-DISPLAY (RECEIVER) 13

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect,(KME10T-220M)	220µF,±20%,10V	
C 2	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 3	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 4	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 5	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 6	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 7	Elect,(KME10T-220M)	220µF,±20%,10V	
C 8	Elect,(KME10T-220M)	220µF,±20%,10V	
C 9	Elect,(KME10T-220M)	220µF,±20%,10V	
C 10	Elect,(KME10T-220M)	220µF,±20%,10V	
J 1	Plug,(CNF3-40P-2.54DSA)	40pins	
Q 1	Not assigned		
Q 2	IC,(74LS139)		
Q 3	IC,(74HC238)		
Q 4	IC,(TD62381P)		
Q 5	IC,(TD62785AP)		
Q 6	IC,(74HC238)		
Q 7	IC,(TD62381P)		
Q 8	Not assigned		
Q 9	IC,(74HC238)		
Q 10	IC,(TD62785AP)		
Q 11	IC,(TD62381P)		
Q 12	Not assigned		
Q 13	IC,(LN442YPH)		
Q 14 to Q 61	LED,(TLG209)		
Q 62	LED,(LN210RP)		
Q 63	LED,(LN210RP)		
Q 64	LED,(LN210RP)		
Q 65	LED,(LN210RP)		
Q 66	LED,(LN210RP)		
Q 67	LED,(LN410YP)		
Q 68	LED,(LN410YP)		
Q 69	LED,(LN410YP)		
Q 70	LED,(LN410YP)		
Q 71	LED,(LN410YP)		
Q 72	LED,(LN210RP)		
Q 73	LED,(LN310GP)		
Q 74	LED,(LT9200N)		
Q 75	LED,(LT9200N)		
Q 76	LED,(LT9200N)		
Q 77	Not assigned		

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A3 R-DISPLAY (RECEIVER) 13

CKT REF	DESCRIPTION	RATING	NOTE
Q 78	Not assigned		
Q 79	Not assigned		
Q 80 to Q 93	IC,(LN513GK)		
R 1	CF,(ARD25T621J)	620Ω,±5%,1/4W	
R 2	CF,(ARD25T330J)	33Ω,±5%,1/4W	
R 3	SIP type,(RRS-6-223JA)	22kΩ x 6,±5%,1/8W	
R 4	SIP type,(RRS-6-223JA)	22kΩ x 6,±5%,1/8W	
R 5	SIP type,(RRS-7-330JB)	33Ω x 7,±5%,1/8W	
R 6	SIP type,(RRS-7-330JB)	33Ω x 7,±5%,1/8W	
R 7	SIP type,(RRS-4-223JA)	22kΩ x 4,±5%,1/8W	
R 8	SIP type,(RRS-7-330JB)	33Ω x 7,±5%,1/8W	
R 9	CF,(ARD25T330J)	33Ω,±5%,1/4W	
S 1 to S 22	Switch,(TM1-01)		

( ): Manufacturer s part number
• : Selected at factory

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Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 2	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 3	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 4	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 5	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 6	Elect,(CE04C1C331A)	330µF,±20%,16V	
C 7	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 8	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 9	Not assigned		
C 10	Cer,(CC924CH1H560J)	56pF,±5%,50V	
C 11	Cer,(CC45CK1H010CY)	1pF,±0.25pF,50V	
C 12	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 13	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 14	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 15	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 16	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 17	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 18	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 19	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 20	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 21	Not assigned		
C 22	Plast,(ECQ-P1103FZ)	0.01µF,±1%,100V	
C 23	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 24	Elect,(CE04C1E101A)	100µF,±20%,25V	
C 25	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 26	Elect,(CE04C1C331A)	330µF,±20%,16V	
C 27	Elect,(CE04C1C331A)	330µF,±20%,16V	
C 28	Elect,(CE04C1C331A)	330µF,±20%,16V	
C 29	Elect,(CE04C1C331A)	330µF,±20%,16V	
C 30	Elect,(CE04C1C331A)	330µF,±20%,16V	
C 31	Elect,(CE04C1C331A)	330µF,±20%,16V	
C 32	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 33	Elect,(CE04C1C331A)	330µF,±20%,16V	
C 34	Elect,(CE04C1C331A)	330µF,±20%,16V	
C 35	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 36	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 37	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 38	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 39	Cer,(CC924CH1H221J)	220pF,±5%,50V	
C 40	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 41	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 42	Elect,(CE04C1H2R2A)	2.2µF,±20%,50V	
C 43	Elect,(CE04C1E470A)	47µF,±20%,25V	
C 44	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 45	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 46	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	
C 47	Cer,(CK924F1H104Z)	0.1µF,+80/-20%,50V	

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING		NOTE
C 48	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 49	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 50	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 51	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 52	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 53	Plast,(ECQ-P1332FZ)	3300pF,±1%,100V		
C 54	Plast,(ECQ-P1242FZ)	2400pF,±1%,100V		
C 55	Cer,(RPE111CH511G50)	510pF,±2%,50V		
C 56	Plast,(ECQ-P1182FZ)	1800pF,±1%,100V		
C 57	Plast,(ECQ-P1152FZ)	1500pF,±1%,100V		
C 58	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C 59	Cer,(CC924CH1H821J)	820pF,±5%,50V		
C 60	Cer,(CC924CH1H621J)	620pF,±5%,50V		
C 61	Cer,(RPE111CH131G50)	130pF,±2%,50V		
C 62	Cer,(CC45CH1H151JY)	150pF,±5%,50V		
C 63	Cer,(CC45CH1H101JY)	100pF,±5%,50V		
C 64	Cer,(CC45CH1H100JY)	10pF,±5%,50V		
C 65	Plast,(ECQ-P1332FZ)	3300pF,±1%,100V		
C 66	Plast,(ECQ-P1242FZ)	2400pF,±1%,100V		
C 67	Cer,(RPE111CH511G50)	510pF,±2%,50V		
C 68	Plast,(ECQ-P1182FZ)	1800pF,±1%,100V		
C 69	Plast,(ECQ-P1152FZ)	1500pF,±1%,100V		
C 70	Cer,(CC924CH1H331J)	330pF,±5%,50V		
C 71	Cer,(CC924CH1H821J)	820pF,±5%,50V		
C 72	Cer,(CC924CH1H621J)	620pF,±5%,50V		
C 73	Cer,(RPE111CH131G50)	130pF,±2%,50V		
C 74	Cer,(CC45CH1H151JY)	150pF,±5%,50V		
C 75	Cer,(CC45CH1H101JY)	100pF,±5%,50V		
C 76	Cer,(CC45CH1H100JY)	10pF,±5%,50V		
C 77	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 78	Plast,(ECQ-V1H105JW)	1uF,±5%,50V		
C 79	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 80	Cer,(CC45CK1H010CY)	1pF,±0.25pF,50V		
C 81	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 82	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 83	Plast,(ECQ-P1241FZ)	2400pF,±1%,100V		
C 84	Cer,(RPE111CH361G50)	360pF,±2%,50V		
C 85	Plast,(ECQ-P1242FZ)	2400pF,±1%,100V		
C 86	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 87	Plast,(ECQ-P1242FZ)	2400pF,±1%,100V		
C 88	Plast,(ECQ-P1103FZ)	0.01uF,±1%,100V		
C 89	Plast,(ECQ-P1103FZ)	0.01uF,±1%,100V		
C 90	Plast,(ECQ-P1103FZ)	0.01uF,±1%,100V		
C 91	Plast,(ECQ-V1H105JW)	1uF,±5%,50V		
C 92	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 93	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 94	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING		NOTE
C 95	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 96	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C 97	Cer,(CC45CK1H010CY)	1pF,±0.25pF,50V		
C 98	Cer,(CC45CH1H470JY)	47pF,±5%,50V		
C 99	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C100	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C101	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C102	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C103	Elect,(CE04C1E101A)	100uF,±20%,25V		
C104	Elect,(CE04C1E101A)	100uF,±20%,25V		
C105	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C106	Cer,(CK924F1H104Z)	0.1uF,+80/-20%,50V		
C107	Cer,(CC45CK1H010CY)	1pF,±0.25pF,50V		
C108	Cer,(CC45CH1H060DY)	6pF,±0.5pF,50V		
C109	Cer,(CC45CH1H060DY)	6pF,±0.5pF,50V		
C110	Cer,(CC45CH1H220JY)	22pF,±5%,50V		
C111	Cer,(CC924CH1H471J)	470pF,±5%,50V		
C112	Cer,(CC45CH1H050CY)	5pF,±0.25pF,50V		
J 1	Cable,(CNF23-26D-AA10S)			
J 2	Plug,(DF1-2P-2.5DSA)	2pins		
J 3	Plug,(DF1-2P-2.5DSA)	2pins		
K 1	Relay,(SVR-5V)			
K 2	Relay,(SVR-5V)			
K 3	Relay,(SVR-5V)			
L 1	Coil,(10K17-85T)	0.358uH		
L 2	Coil,(LH1-332K)	3.3mH,±10%		
L 3	Coil,(LH1-332K)	3.3mH,±10%		
L 4	Coil,(LH1-152K)	1.5mH,±10%		
L 5	Coil,(LH1-152K)	1.5mH,±10%		
L 6	Coil,(LH1-152K)	1.5mH,±10%		
L 7	Coil,(LH1-821K)	820uH,±10%		
L 8	Coil,(LH1-821K)	820uH,±10%		
L 9	Coil,(LH1-821K)	820uH,±10%		
L 10	Coil,(LF8-391K)	390uH,±10%		
L 11	Coil,(LF8-121K)	120uH,±10%		
L 12	Coil,(LF8-121K)	120uH,±10%		
L 13	Coil,(LF8-560K)	56uH,±10%		
L 14	Coil,(LH1-332K)	3.3mH,±10%		
L 15	Coil,(LH1-332K)	3.3mH,±10%		
L 16	Coil,(LH1-152K)	1.5mH,±10%		
L 17	Coil,(LH1-152K)	1.5mH,±10%		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING		NOTE
L 18	Coil,(LH1-152K)	1.5mH,±10%		
L 19	Coil,(LH1-821K)	820uH,±10%		
L 20	Coil,(LH1-821K)	820uH,±10%		
L 21	Coil,(LH1-821K)	820uH,±10%		
L 22	Coil,(LF8-391K)	390uH,±10%		
L 23	Coil,(LF8-121K)	120uH,±10%		
L 24	Coil,(LF8-121K)	120uH,±10%		
L 25	Coil,(LF8-560K)	56uH,±10%		
Q 1	Tr,(2SC1907)			
Q 2	Tr,(2SA1206)			
Q 3	Tr,(2SA1206)			
Q 4	Tr,(2SA1206)			
Q 5	Tr,(2SA1206)			
Q 6	IC,(uPC1430SH)			
Q 7	Di,(1S953)			
Q 8	IC,(uPC151C)			
Q 9	IC,(NJU201AD)			
Q 10	IC,(NJU201AD)			
Q 11	IC,(10124)			
Q 12	IC,(uPD8255AC-2)			
Q 13	IC,(10116)			
Q 14	IC,(10105)			
Q 15	IC,(10131)			
Q 16	IC,(10102)			
Q 17	IC,(10102)			
Q 18	IC,(10131)			
Q 19	Tr,(2SC2718)			
Q 20	Tr,(2SC2718)			
Q 21	Tr,(2SC2718)			
Q 22	Tr,(2SC2718)			
Q 23	IC,(NJU201AD)			
Q 24	IC,(74LS14)			
Q 25	IC,(74LS20)			
Q 26	IC,(74LS393)			
Q 27	IC,(74LS393)			
Q 28	IC,(TD62003P)			
Q 29	IC,(74LS86)			
Q 30	IC,(74LS74)			
Q 31	IC,(74LS123)			
Q 32	Di,(1S953)			
Q 33	IC,(10136)			
Q 34	IC,(10136)			
Q 35	IC,(MC12040L)			
Q 36	IC,(10102)			
Q 37	IC,(10102)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING		NOTE
Q 38	Not assigned			
Q 39	IC,(NJU201AD)			
Q 40	Tr,(2SC2718)			
Q 41	Tr,(2SC2718)			
Q 42	Tr,(2SC2718)			
Q 43	Tr,(2SC2718)			
Q 44	IC,(NJU201AD)			
Q 45	IC,(HA3-2525-5)			
Q 46	IC,(uPC151C)			
Q 47	IC,(HA3-2525-5)			
Q 48	Tr,(2SC2718)			
Q 49	Tr,(2SC2718)			
Q 50	Tr,(2SC2718)			
Q 51	Tr,(2SC2718)			
Q 52	IC,(HA3-2525-5)			
Q 53	IC,(NJU201AD)			
Q 54	IC,(HA3-2525-5)			
Q 55	IC,(HA3-2525-5)			
Q 56	IC,(HA3-2525-5)			
Q 57	IC,(uPC271C)			
Q 58	Di,breakdown,(1S252)	5.9 to 6.5V,250mW		
Q 59	IC,(uPC151C)			
Q 60	IC,(HA17012PC)			
Q 61	IC,(74LS191)			
Q 62	IC,(74LS191)			
Q 63	IC,(74LS191)			
Q 64	IC,(74LS123)			
Q 65	IC,(uPC271C)			
Q 66	IC,(uPC271C)			
Q 67	Tr,(2SC1907)			
Q 68	IC,(NJU201AD)			
Q 69	Not assigned			
Q 70	Not assigned			
Q 71	Not assigned			
Q 72	Not assigned			
Q 73	Not assigned			
Q 74	Not assigned			
Q 75	Not assigned			
Q 76	IC,(74LS74)			
R 1	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 2	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 3	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 4	CF,(ARD25T332J)	3.3kΩ,±5%,1/4W		
R 5	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 6	CF,(ARD25T331J)	330Ω,±5%,1/4W		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING		NOTE
R 7	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 8	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R 9	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 10	Not assigned			
R 11	Not assigned			
R 12	Not assigned			
R 13	Not assigned			
R 14	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W		
R 15	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 16	CF,(ARD25T223J)	22kΩ,±5%,1/4W		
R 17	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 18	CM,var,(RJ-6P 5KΩ)	5kΩ,1/2W		
R 19	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 20	CF,(ARD25T333J)	33kΩ,±5%,1/4W		
R 21	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 22	CF,(ARD25T181J)	180Ω,±5%,1/4W		
R 23	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 24	SIP type,(RRS-6-681JA)	680Ω x 6,±5%,1/8W		
R 25	SIP type,(RRS-8-681JA)	680Ω x 8,±5%,1/8W		
R 26	SIP type,(RRS-6-681JA)	680Ω x 6,±5%,1/8W		
R 27	Not assigned			
R 28	Not assigned			
R 29	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 30	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 31	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 32	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 33	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 34	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 35	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 36	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 37	CM,var,(RJ-6P 200Ω)	200Ω,1/2W		
R 38	CM,var,(RJ-6P 200Ω)	200Ω,1/2W		
R 39	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 40	MF,(RN14K2E6810D)	681Ω,±0.5%,1/4W		
R 41	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 42	MF,(RN14K2E8060D)	806Ω,±0.5%,1/4W		
R 43	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 44	MF,(RN14K2E7680D)	768Ω,±0.5%,1/4W		
R 45	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 46	MF,(RN14K2E8060D)	806Ω,±0.5%,1/4W		
R 47	CM,var,(RJ-6P 200Ω)	200Ω,1/2W		
R 48	CM,var,(RJ-6P 200Ω)	200Ω,1/2W		
R 49	SIP type,(RRS-8-472JA)	4.7kΩ x 8,±5%,1/8W		
R 50	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 51	CF,(ARD25T683J)	68kΩ,±5%,1/4W		
R 52	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 53	CF,(ARD25T223J)	22kΩ,±5%,1/4W		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING		NOTE
R 54	MF,(RN14K2E2151D)	2.15kΩ,±0.5%,1/4W		
R 55	MF,(RN14K2E2491D)	2.49kΩ,±0.5%,1/4W		
R 56	MF,(RN14K2E2151D)	2.15kΩ,±0.5%,1/4W		
R 57	MF,(RN14K2E2491D)	2.49kΩ,±0.5%,1/4W		
R 58	MF,(RN14K2E3161D)	3.16kΩ,±0.5%,1/4W		
R 59	CF,(ARD25T474J)	470kΩ,±5%,1/4W		
R 60	Not assigned			
R 61	Not assigned			
R 62	CF,(ARD25T474J)	470kΩ,±5%,1/4W		
R 63	SIP type,(RRS-6-681JA)	680Ω x 6,±5%,1/8W		
R 64	CF,(ARD25T820J)	82Ω,±5%,1/4W		
R 65	CF,(ARD25T131J)	130Ω,±5%,1/4W		
R 66	SIP type,(RRS-6-471JA)	470Ω x 6,±5%,1/8W		
R 67	SIP type,(RRS-8-471JA)	470Ω x 8,±5%,1/8W		
R 68	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 69	MF,(RN14K2E9090D)	909Ω,±0.5%,1/4W		
R 70	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 71	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 72	MF,(RN14K2E8060D)	806Ω,±0.5%,1/4W		
R 73	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 74	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 75	MF,(RN14K2E9090D)	909Ω,±0.5%,1/4W		
R 76	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 77	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 78	MF,(RN14K2E8660D)	866Ω,±0.5%,1/4W		
R 79	CF,(ARD25T101J)	100Ω,±5%,1/4W		
R 80	MF,(RN14K2E1691D)	1.69kΩ,±0.5%,1/4W		
R 81	CF,(ARD25T682J)	6.8kΩ,±5%,1/4W		
R 82	CF,(ARD25T682J)	6.8kΩ,±5%,1/4W		
R 83	MF,(RN14K2E1101D)	1.1kΩ,±0.5%,1/4W		
R 84	MF,(RN14K2E1101D)	1.1kΩ,±0.5%,1/4W		
R 85	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 86	CF,(ARD25T682J)	6.8kΩ,±5%,1/4W		
R 87	CF,(ARD25T682J)	6.8kΩ,±5%,1/4W		
R 88	CF,(ARD25T104J)	100kΩ,±5%,1/4W		
R 89	MF,(RN14K2E1072D)	10.7kΩ,±0.5%,1/4W		
R 90	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 91	MF,(RN14K2E5360D)	536Ω,±0.5%,1/4W		
R 92	MF,(RN14K2E2001D)	2kΩ,±0.5%,1/4W		
R 93	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 94	MF,(RN14K2E5361D)	5.36kΩ,±0.5%,1/4W		
R 95	MF,(RN14K2E1542D)	15.4kΩ,±0.5%,1/4W		
R 96	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 97	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 98	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 99	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R100	CF,(ARD25T103J)	10kΩ,±5%,1/4W		

( ): Manufacturer's part number
* : Selected at factory

Parts List: A5 JITTER MEASUREMENT (RECEIVER) 14

CKT REF	DESCRIPTION	RATING		NOTE
R101	MF,(RN14K2E1002D)	10kΩ,±0.5%,1/4W		
R102	MF,(RN14K2E3311D)	3.31kΩ,±0.5%,1/4W		
R103	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R104	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W		
R105	MF,(RN14K2E3011D)	3.01kΩ,±0.5%,1/4W		
R106	MF,(RN14K2E2741D)	2.74kΩ,±0.5%,1/4W		
R107	Not assigned			
R108	MF,(RN14K2E3010D)	301Ω,±0.5%,1/4W		
R109	MF,(RN14K2E1691D)	1.69kΩ,±0.5%,1/4W		
R110	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R111	CF,(ARD25T473J)	47kΩ,±5%,1/4W		
R112	CF,(ARD25T154J)	150kΩ,±5%,1/4W		
R113	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		
R114	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R115	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R116	CF,(ARD25T152J)	1.5kΩ,±5%,1/4W		
R117	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R118	CF,(ARD25T151J)	150Ω,±5%,1/4W		
R119	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R120	MF,(RN14K2E2001D)	2kΩ,±0.5%,1/4W		
R121	MF,(RN14K2E1331D)	1.33kΩ,±0.5%,1/4W		
R122	MF,(RN14K2E1331D)	1.33kΩ,±0.5%,1/4W		
R123	MF,(RN14K2E1331D)	1.33kΩ,±0.5%,1/4W		
R124	CM,var,(RJ-6P 500Ω)	500Ω,1/2W		
R125	CM,var,(RJ-6P 500Ω)	500Ω,1/2W		
R126	CM,var,(RJ-6P 500Ω)	500Ω,1/2W		
R127	CM,var,(RJ-6P 500Ω)	500Ω,1/2W		
R128	Not assigned			
R129	Not assigned			
R130	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R131	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R132	Not assigned			
R133	CM,var,(RJ-6P 500Ω)	500Ω,1/2W		
R134	CM,var,(RJ-6P 500Ω)	500Ω,1/2W		
Z 1	XTAL OSC,(44X79277X)	22.368MHz		
Z 2	XTAL OSC,(44X79277AB)	25.248MHz		
Z 3	XTAL OSC,(44X79277W)	18.912MHz		
Z 4	XTAL OSC,(44X79277V)	18.528MHz		
Z 5	Delay line,(AT-10)			

( ): Manufacturer's part number
* : Selected at factory

Parts List: A4 R-SWITCH (RECEIVER) 15

CKT REF	DESCRIPTION	RATING		NOTE
J 1	Plug,(CNF23-34D-AA30S)			
S 1	Switch,(SLEP223D-F)			
S 2	Not assigned			
S 3	Not assigned			
S 4	DIP,(51D-0801)			
S 5	DIP,(51D-0801)			
S 6	DIP,(51D-0801)			

( ): Manufacturer's part number
* : Selected at factory

Parts List : A8 PRINTER UNIT 16

CKT REF	DESCRIPTION	RATING	NOTE
J 1	Connector, (DF1-5S-2.5R24)		
J 2	Connector, (DF1-5S-2.5R24)		
Z 1	PRINTER INTERFACE		44W85804
Z 2	PRINTER CONTROL		44W85805
Z 3	PRINTER, (FTP-020M008)		

( ): Manufacturer's part number
• : Selected at factory

Parts List : Z1 in A8 PRINTER INTERFACE 17

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect,(CE04W1A471)	470μF,±20%,10V	
C 2	Elect,(CE04W1A471)	470μF,±20%,10V	
C 3	Elect,(CE04W1V101)	100μF,±20%,35V	
C 4	Cer,(CC924CH1H * J)	12 to 33pF,±5%,50V	•
C 5	Not assigned		
C 6	Not assigned		
C 7	Not assigned		
C 8	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C 9	Cer,(CK924C1H103M)	0.01μF,±20%,50V	
C10	Cer,(CK924C1H103M)	0.01μF,±20%,50V	
C11	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C12	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C13	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C14	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C15	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C16	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C17	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C18	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C19	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C20	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C21	Cer,(CC924CH1H * J)	12 to 33pF,±5%,50V	•
C22	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C23	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C24	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C25	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C26	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
C27	Cer,(CK924F1H104Z)	0.1μF,+80/-20%,50V	
J 1	Connector, (HIF3-20P-2.54DS)	20P	
J 2	Connector, (FCN364J032)	32P	
J 3	Connector, (DF1-5P-2.5DSA)	5P	
J 4	Not assigned		
L 1	Coil,(LF8-101K)	100μH	
Q 1	IC,(74ALS574N)		
Q 2	IC,(74LS540)		
Q 3	IC,(74LS74A)		
Q 4	Not assigned		
Q 5	IC,(μPD8748D)		

M-1

( ): Manufacturer's part number
• : Selected at factory

Parts List : Z1 in A8 PRINTER INTERFACE 17

CKT REF	DESCRIPTION	RATING	NOTE
Q 6	IIC,(EPROM32X8-C)		
Q 7	IC,(74LS541)		
Q 8	IC,(μPD82C43C)		
Q 9	IC,(SN74ALS574N)		
Q10	IC,(M54563P)		
Q11	IC,(M54563P)		
Q12	IC,(μPC277C)		
Q13	IC,(74F537PC)		
Q14	Tr,(2SC1907)		
Q15	Tr,(2SD571)		
Q16	Tr,(2SB605)		
Q17	Tr,(2SD571)		
Q18	Tr,(2SB605)		
Q19	Tr,(2SC1907)		
Q20	Di,(1S953)		
Q21	Di,breakdown,(RD13E)	12.11 to 13.66V, 400mW	
Q22	IC,(TL7705CP-B)		
Q23	Tr,(2SD833)		
Q24	Tr,(2SD833)		
Q25	Tr,(2SD833)		
Q26	Tr,(2SD833)		
Q27	Tr,(2SD833)		
Q28	Tr,(2SD833)		
Q29	Tr,(2SD833)		
Q30	Tr,(2SD833)		
Q31	Tr,(2SD833)		
Q32	Tr,(2SD833)		
Q33	Not assigned		
Q34	Di,(μPA54H)		
Q35	Di,(μPA54H)		
Q36	Di,(1S953)		
Q37	Di,(1S953)		
Q38	Di,(1S953)		
Q39	Di,(1S953)		
Q40	Di,breakdown,(RD6.2EB)	5.78 to 6.44V,400mW	
R 1	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 2	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 3	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R 4	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 5	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R 6	Not assigned		
R 7	Not assigned		

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( ): Manufacturer's part number
• : Selected at factory

Parts List : Z1 in A8 PRINTER INTERFACE 17

CKT REF	DESCRIPTION	RATING	NOTE
R 8	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R 9	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R10	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R11	CF,(ARD25T181J)	180Ω,±5%,1/4W	
R12	CF,(ARD25T181J)	180Ω,±5%,1/4W	
R13	CF,(ARD25T183J)	18kΩ,±5%,1/4W	
R14	CF,(ARD25T472J)	4.7kΩ,±5%,1/4W	
R15	CF,(ARD25T123J)	12kΩ,±5%,1/4W	
R16	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R17	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R18	CF,(ARD25T111J)	110Ω,±5%,1/4W	
R19	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R20	CF,(ARD25T221J)	220Ω,±5%,1/4W	
R21	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R22	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R23	CF,(ARD25T103J)	10kΩ,±5%,1/4W	
R24	CF,(ARD25T123J)	12kΩ,±5%,1/4W	
R25	CF,(ARD25T223J)	22kΩ,±5%,1/4W	
R26	CF,(ARD25T511J)	510Ω,±5%,1/4W	
R27	CF,(ARD25T111J)	110Ω,±5%,1/4W	
R28	CF,(ARD25T122J)	1.2kΩ,±5%,1/4W	
R29	CF,(ARD25T102J)	1kΩ,±5%,1/4W	
R30	Not assigned		
R31	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R32	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R33	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R34	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R35	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R36	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R37	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R38	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R39	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W	
R40	CF,(ARD25T222J)	10kΩ,±5%,1/4W	
R41	CF,(ARD25T103J)	100kΩ,±5%,1/4W	
R42	CF,(ARD25T104J)	10kΩ,±5%,1/4W	
R43	CF,(ARD25T103J)	1.50kΩ,±0.5%,1/4W	
R44	MF,(RN14K2E1501D)		
R45	Not assigned		
X 1	XTAL OSC,(TQC-208B)	6MHz	

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( ): Manufacturer's part number
• : Selected at factory

Parts List : Z2 in A8 PRINTER CONTROL 18

CKT REF	DESCRIPTION	RATING	NOTE
J 1	Connector, (DF1-5P-2.5DSA)		
Q 1	LED, (TLG226)		
S 1	Switch, (HL20-NS)		
S 2	Switch, (HL20-NS)		

( ): Manufacturer's part number
• : Selected at factory

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Parts List : A6 (Option 42) GP-IB 8

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect, (CE02C1A470)	47μF, ±20%, 10V	
C 2	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 3	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 4	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 5	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 6	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 7	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 8	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
J 1	Pattern		
J 2	Connector, (57LE-20240-27CO-D35H)		
Q 1	IC, (75160A)		
Q 2	IC, (75162A)		
Q 3	IC, (μPD7210C)		
Q 4	IC, (74LS00)		
Q 5	IC, (74LS367A)		
Q 6	IC, (74LS240)		
Q 7	IC, (74LS74A)		
Q 8	IC, (74LS32)		
Q 9	IC, (74LS139)		
R 1	Single in-line array, (IHR-8-103JA)	10kΩ x 8, 1/8W	
S 1	Dip, (BP-8)		

( ): Manufacturer's part number
• : Selected at factory

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Parts List : A7 (Option 43) RS-232C 9

CKT REF	DESCRIPTION	RATING	NOTE
C 1	Elect, (CE02C1A470)	47μF, ±20%, 10V	
C 2	Elect, (CE02C1C330)	33μF, ±20%, 16V	
C 3	Elect, (CE02C1C330)	33μF, ±20%, 16V	
C 4	Cer, (CC924CH1H151J)	150pF, ±5%, 50V	
C 5	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 6	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 7	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 8	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C 9	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C10	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C11	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C12	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
C13	Cer, (CK924F1H104Z)	0.1μF, +80/-20%, 50V	
J 1	Pattern		
J 2	Connector, (DB-25SA-J4)		
Q 1	IC, (SN75189AN)		
Q 2	IC, (74LS240)		
Q 3	IC, (SN75188N)		
Q 4	IC, (μPD8251AFC)		
Q 5	IC, (74LS04)		
Q 6	IC, (74LS367A)		
Q 7	IC, (COM8146)		
Q 8	IC, (74LS139)		
R 1	Single in-line array, (IHR-8-103JA)	10kΩ x 8, 1/8W	
R 2	Single in-line array, (IHR-4-103JA)	10kΩ x 4, 1/8W	
S 1	Dip, (S-2031)		
S 2	Dip, (B-8A)		
X 1	XTAL OSC, (NX-5068)	5.0688MHz	

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A9 (Option 03) DS-1 OUTPUT 19

CRT REF	DESCRIPTION	RATING	NOTE
C 1	Elect, (CE04C1C331A)	330uF, ±20%, 16V	
C 2	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 3	Cer, (CE04C1C331A)	330uF, ±20%, 16V	
C 4	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 5	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 6	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 7	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 8	Cer, (CK924C1H472M)	4700pF, ±20%, 50V	
C 9	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 10	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 11	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 12	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 13	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 14	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 15	Elect, (CE04C1C331A)	330uF, ±20%, 16V	
C 16	Cer, (CK924F1H104Z)	0.1uF, +80/-20%, 50V	
C 17	Not assigned		
J 1	Plug, (DF1-10P2.5DSA)	10pins	
J 2	Plug, (DF1-3P2.5DSA)	3pins	
J 3	Plug, (DF1-2P2.5DSA)	2pins	
L 1	Coil, (LF8-470K)	47uH, ±10%	
Q 1	IC, (74HCT00P)		
Q 2	IC, (74HC393)		
Q 3	IC, (74HC74)		
Q 4	IC, (74HC393)		
Q 5	IC, (74HC74)		
Q 6	IC, (MC4044)		
Q 7	Not assigned		
Q 8	IC, (74HC74)		
Q 9	IC, (MSM6903AS)		
Q 10	IC, (XR-T5670CP)		
Q 11	IC, (74LS38)		
Q 12	Tr, (2SC2901)		
Q 13	Tr, (2SC2901)		
Q 14	Tr, (2SC2901)		
Q 15	Di, (1S953)		
Q 16	Di, (1S953)		
Q 17	IC, (μPC14305H)		
R 1	CF, (ARD25T103J)	10kΩ, ±5%, 1/4W	
R 2	CF, (ARD25T102J)	1kΩ, ±5%, 1/4W	
R 3	CF, (ARD25T224J)	220kΩ, ±5%, 1/4W	

( ): Manufacturer's part number
• : Selected at factory

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Parts List: A9 (Option 03) DS-I OUTPUT 19

CKT REF	DESCRIPTION	RATING		NOTE
R 4	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 5	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R 6	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 7	CF,(ARD25T391J)	390Ω,±5%,1/4W		
R 8	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 9	CF,(ARD25T331J)	330Ω,±5%,1/4W		
R 10	CF,(ARD25T102J)	1kΩ,±5%,1/4W		
R 11	CF,(ARD25T271J)	270Ω,±5%,1/4W		
R 12	CF,(ARD25T222J)	2.2kΩ,±5%,1/4W		
R 13	CF,(ARD25T751J)	750Ω,±5%,1/4W		
R 14	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 15	CF,(ARD25T681J)	680Ω,±5%,1/4W		
R 16	CM,var,(RJ6P200Ω)	200Ω,1/2W		
R 17	CF,(ARD25T103J)	10kΩ,±5%,1/4W		
R 18	CF,(ARD25T100J)	10Ω,±5%,1/4W		
R 19	CF,(ARD25T100J)	10Ω,±5%,1/4W		
R 20	CF,(ARD25T221J)	220Ω,±5%,1/4W		
R 21	CF,(ARD25T221J)	22pΩ,±5%,1/4W		
T 1	Trans,(439T23519)			
Z 1	XTAL OSC,(VCXO-105G)	3.088MHz		

( ): Manufacturer's part number

* : Selected at factory

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